

COMPUTERWORLD

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Shoot-out at SQL corral

Gates, Esber clash over Novell technology access

BY PATRICIA KEEFE
and DOUGLAS BARNEY
CW STAFF

DALLAS — With his slight build and his glasses, Microsoft Chairman Bill Gates could hardly pass for a seasoned gunfighter, but last Monday he won a shoot-out with Ashton-Tate Chairman Ed Esber and, in the process, blew away Novell's shot at the database market.

Before the smoke cleared, Gates had strong-armed Ashton-Tate into canceling a 2½-hour-long press conference and

shucking a strategic alliance with Novell, Inc. The deal would have netted Novell marketing rights and technical access to SQL Server, a product being jointly developed by Ashton-Tate Corp., Microsoft Corp. and Sybase, Inc. Novell and Microsoft are archrivals in local-area network operating systems.

The agreement, positioned as a centerpiece of the Novell-sponsored Network 88 show, disintegrated after virulent and loud objections voiced by Gates in the hallway of an industry conference held last week in California, according to analysts and knowledgeable sources close to all three companies. SQL Server is a networked personal computer database scheduled to ship later this year that runs under Microsoft's OS/2.

Agreement squashed If the agreement had not been squashed, Novell could have bundled the unshipped SQL Server with its popular Netware local-area network operating system software and sold it through thousands of Novell resellers, a source close to the company said. Under terms of

Continued on page 6

EPA targets halon: Data site dilemma

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Environmental Protection Agency called last week for a complete phaseout of halon — the chemical used in fire-suppression equipment at many data centers — because it contributes to the depletion of the Earth's protective ozone layer.

The EPA earlier had sought a 50% reduction in chlorofluorocarbons and halons; however, EPA Administrator Lee M. Thomas said new scientific evidence shows that the ozone-depletion problem is worse than

previously thought.

The EPA urged that an international ozone treaty called the Montreal Protocol be revised to require a 100% phaseout of CFCs and halons, rather than a 50% reduction. Thomas did not announce specific regulatory actions or a timetable for the phaseout in the U.S., which would be implemented after revision of the protocol, but there is speculation the phaseout would take about 10 years.

Some MIS managers have already switched from halon-based systems to water sprinklers in response to the earlier

Continued on page 4

Atmospheric alert

The EPA says Halon 1301, widely used in data centers, may be a danger in the ozone layer

Chemical	1980 U.S. consumption	Production growth rate*	Lifetime in atmosphere
Halon 1301	43.4 million kg	2.7%	110 years
Halon 1211		4.3%	25 years
CFC-113	54.6 million kg	2.9%	90 years

* Average annual growth rate in U.S. production, without regulations, from 1985 to 1990
SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY
CW STAFF

Users push wish list on ISDN firms

BY JEAN S. BOZMAN
CW STAFF

ST. LOUIS — Large corporate users sat down and reasoned with vendors at a meeting of the North American ISDN Users' Forum here last week. When the three-day meeting ended, vendors had a list of nearly 30 priority applications that users would like to see up and running in the early stages of Integrated Services Digital Network implementation.

"The user is, in effect, doing some of the market research for the ISDN vendors," said Michael A. Kanthal, a Citicorp NA vice-president who chaired the financial users group here.

"We're coming up with business needs and goals for ISDN, and the vendors will try to meet those with products." About 90 users met in industry-specific workshops to refine proposed applications while 100 vendor representatives looked on.

"Hopefully we're moving toward standards that will allow

Continued on page 133

THE ULTIMATE ENTREPRENEUR

How DEC passed up the PC boom

The following is an excerpt from the new book *The Ultimate Entrepreneur*, written by *Computersworld* editors Glenn Rifkin and George Harrar and published by Contemporary Books.

A Dan Bricklin sat in his finance class at the Harvard Business School, and the idea started coming to him. He'd been making errors consistently on his assignment: three-year cash and balance sheet projections. He was relying on his Texas Instruments calculator to handle the complex manipulation of numbers.

But this little machine wasn't doing the job. As Bricklin stared at the blackboard over the next few days, an idea

formed in his mind for computing these calculations more quickly. He imagined an electronic spreadsheet.

Bricklin needed a machine to bring his idea to life. It was the spring of 1978, and personal computers were just hitting the market. Before going to Harvard, Bricklin had spent

three years at Digital Equipment Corp. as a programmer. He had worked on all of the company's major lines — the PDP-8, Decsystem-10 and PDP-11. He'd seen the beginnings of the VAX. He had a passion for DEC machines.

A few months before Bricklin attended DEC's stockholders' meeting and seen a demonstration of the PDP-11, or Programmable Data Terminal, which came from Vice-President Andy Knowles' terminals group. Knowles had long held the vision of DEC building a PC, but it was clear that Ken Olsen, DEC's president, didn't believe in such a machine. He had gone so far as to prohibit the use of the term "personal computer" within the firm.

Continued on page 37



Ken Olsen

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KEN OLSEN
DEC CHAIRMAN, 1974

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NEWS

Olympic detectives

HP's chemical-testers sniffed out steroid use

BY J. A. SAVAGE
OF STAFF

Canada's Olympic ex-medalist, Ben Johnson, lost his gold to a reputed steroid habit. But no one would have been the wiser with out one of the 12 Hewlett-Packard Co. computer-based chemical-measuring devices sent to the Olympics to keep the competitors honest.

The Doping Control Center of the Korean Advanced Institute of Science and Technology bought six HP Gas Chromatograph/Mass Spectrometers, and HP donated another six of the \$60,000 machines for the duration of the Olympics.

A test takes about half an hour, during which chemical elements are physically separated out of an athlete's urine. The mass spectrometer part of the machine measures chemical molecules and graphically produces patterns characteristic of the molecular structure, much like a fingerprint.

The chromatograph displays on a monitor a time line of peaks and valleys representative of those molecules during the time they are spun out of the spectrometer.

Joe Friday would be proud

"A user will move the cursor to a peak and ask the computer for the molecular spectrum that peak represents," said Larry Catran, HP's product line manager for the system. "Then he will ask for a search. The computer will search up to 70,000 fingerprints in 30 seconds."

Catran said, for instance, that if you are looking for cocaine, you match the library fingerprint for the chemical with what the mass spectrometer has found in the athlete's urine.

The systems are based on HP 9000 workstations. Catran said the Doping Center needed 24-hour turnaround on the tests; thus, HP loaned it half of the machines just for peak use during the Olympics.

IBM denies plans for 386-based AT bus PC

BY WILLIAM BRANDEL
OF STAFF

IBM last week denied a report by *The Wall Street Journal* that it is discussing the possibility of introducing an Intel Corp. 80386 personal computer based on the IBM Personal Computer AT bus but it may introduce more AT bus machines in the future.

Responding to the *Journal* report that IBM is developing a PC using the Intel 80386SX chip without the Micro Channel, an IBM spokesman said, "We have no plans to introduce a machine based on the 80386 chip without using the Micro Channel. The story is wrong."

She said IBM will continue to enhance its low-end product line "at every price point. The Model 30s and 50s are examples of this."

When introducing the Personal System/2s in April, IBM said it was discontinuing, but did not rule out reintroducing, the AT bus. IBM is currently being perceived as loosening its embrace on the Micro Channel after resurrecting the AT bus in the Model 30 announcement in August.

Adding to a deteriorating relationship with the MIS community, IBM has internal confusion to sort, said John Dunkle, vice-president of the Aberdeen Group, a Boston-based market

research firm.

Dunkle said IBM will stick to its corporate rhetorical support of the Micro Channel. But he added it may be forced to bring another AT bus product to its customers, "which will just compound the market chaos and leave MIS in the crunch."

The IBM spokeswoman ad-

"I WAS tough to leave behind the AT. But if we had to do it over again, we'd do the same thing."

IBM SPOKESWOMAN

mitted that IBM was forced to make a painful decision regarding the AT bus. "It was tough to leave behind the AT. But if we had to do it over again, we'd do the same thing," she said.

Compaq Corp. Vice-President of Sales and Marketing Mike Swarley said that it would make sense for IBM to continue introducing products based around the 18-bit industry standard architecture bus. "The introduction of the Model 30 is more evidence that [this architecture] is the largest market opportunity out there," he said.



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EDS escalates Perot squabble

GM-owned firm sues former founder over noncompete agreement

BY NELL MARGOLIS
CW STAFF

HERNDON, Va. — Fighting the hard fact that once fed it, Electronic Data Systems Corp. (EDS) last week sued founder H. Ross Perot for breach of the noncompetition contract he signed in December 1987 as part of General Motors Corp.'s \$700 million purchase of EDS.

The flamboyant Texas entrepreneur's latest venture — Vienna, Va.-based systems integration company Perot Systems, Inc. — was named codefendant in the suit, which initially asks for an injunction halting further Perot activity. A hearing has been assigned for Oct. 13.

No particular event triggered the legal action, an EDS spokesman said. "It just became clear from a number of public statements and marketing events that [Perot] had no intention of honoring his contract not to compete with EDS."

However, in a prepared state-

ment, Perot said, "I am meticulously following the letter and spirit of the buyout agreement."

"There is absolutely no doubt whatsoever that Perot Systems is competing, and competing aggressively, with EDS," said Stephen McClellan, an analyst at Merrill Lynch & Co. However, the question is not whether Perot is competing with EDS but whether he is doing it lawfully, within the meaning of the 1987 contract, McClellan added.

"He's a pretty astute person," McClellan said, "and he and his lawyers all know [the noncompetition agreement] backwards and forwards."

As soon as possible
Perot Systems opened its doors this past June — the earliest allowable date under terms of the contested agreement, according to McClellan — with about 50 ex-EDS employees on the staff, including eight executives. The newcomer immediately picked a plumber: a 10-year sole-source con-

tract to provide systems integration services to the U.S. Postal Service.

The contract award was protested by EDS and a third sys-



H. Ross Perot

tems integration contender, Planning Research Corp.

The General Services Administration's Board of Contract Appeals ruled it illegal, and the contract was subsequently modified, but Perot was kept on in what appeared to be a general con-

tractor's role.

Late last week, a federal appeals court decided that the GSA is without jurisdiction over Postal Service contracts, giving Perot and the post office a green light. The EDS lawsuit, however, now poses a potential barrier to Perot's keeping the lucrative contract.

Notwithstanding EDS' protests, McClellan targets the sweetheart deal with the Postal Service as the starting point for the current — and escalating — hostilities between General Motors/EDS and Perot. The EDS suit, he said, "is their counterpunch for the Postal Service's contract."

Whatever began the fight, Perot last week left no doubt about his thoughts as to who would finish it. "GM will not succeed," Perot said. "It has made a serious strategic mistake, opening a Pandora's box of potential legal consequences."

Karen Kugel, an analyst at Framingham, Mass.-based market research firm International Data Corp., said that users should not be blinded by the fireworks. "It's not as though we have only two gladiators in the ring," Kugel said.

Halon

FROM PAGE 1

EPA warnings, according to Glenn T. Young, a disaster-recovery consultant at Coopers & Lybrand in Houston.

Young said it is too early to tell whether there will be halon shortages or steep price hikes for halon-based systems [CW, July 11].

Several MIS managers contacted last week had not heard of the EPA's concerns but said they are reluctant to switch to sprinklers. "Sometimes water causes more damage to computers than anything else," said Jack Caulfield, MIS director at Pall Corp. in East Hills, N.Y.

Jerry T. Naffier, director of information services at Welch Foods, Inc. in Westfield, N.Y., called sprinklers a disaster for a

data center. Saying that halon-based systems are "one of the few systems that insurance companies recommend," he said MIS managers will need other alternatives if halon is banned.

Meanwhile, the halon products industry is counting on Du Pont Co. and other halon producers to come up with an economically alternative to halon 1301, used in fire-suppression equipment for computer rooms.

The industry is also conducting research on new ways to test halon systems so that halon is not actually discharged during system testing, according to William Henderson, halon product manager at the Pyrotechnics division of Cerberus Technologies, Inc. in Cedar Knolls, N.J.

Halon 1301 is used in data centers and document rooms because it leaves no residue and is nontoxic to humans so that the

room does not have to be evacuated. Another halon compound, Halon 1211, is found in portable fire extinguishers that are sometimes used in computer rooms.

Still in the game

Henderson cautioned that it is not time to push the panic button for the halon industry because halon is a long way from being banned, and extensive research is underway to find a chemical substitute.

"We recognize that something must be done... but we don't want to be picked on," Henderson said. "Halon is a very minute part of the [ozone] problem."

EPA officials agreed that CFC emissions are by far the biggest culprit, but they added that halons are, kilogram for kilogram, more potent ozone-depleters than CFCs and therefore

should be regulated.

Ozone in the upper atmosphere shields the earth's surface from harmful ultraviolet radiation that can cause skin cancer and eye cataracts in people and damage forests, crops and wildlife.

The EPA's Thomas said that new studies "point an alarming picture of present and future global ozone levels."

The EPA noted that the halon industry has taken several steps to reduce unnecessary emissions. For example, the industry decided to not require mandatory discharge testing of new systems under its fire-protection code. Further, it is exploring the development of alternative test gases. It is seeking ways to limit discharges from false alarms and it is considering methods of tracking and regulating halon emissions.

CORRECTIONS

Not all upgrades to National Advanced Systems' AS/EX series [CW Sept. 19] require bit swaps. That type of "transition upgrade" is needed when moving from the Models 40 and below to a Model 50 and above. The upgrade from an ASXL model to an AS/EX model is a field upgrade involving replacement of circuit boards and microcode.

Amdahl Corp. processors were omitted from the Last Systems Roundup [CW, Sept. 19]. For information, Amdahl can be contacted at 408-746-6000.

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Prime eyes another spending spree

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Prime Computer, Inc. has its wallet out again, according to industry sources. This time it is said to be ready to pick up General Electric Co.'s Calma subsidiary, a computer-aided design and manufacturing (CAD/CAM) company with declining sales and a desirable customer base that could shore up Prime's market position against a suddenly strong challenge from Intergraph Corp.

"Our company policy is not to

comment on possible mergers or acquisitions," Prime spokesman Joe Gavaghan said. He confirmed, however, that Prime's intent to grow through acquisitions has been frequently alluded to by company executives, including Chief Executive Officer Chas. M. Henson.

Prime stunned investors in December with its \$435 million hostile takeover of Computervision Corp., which catapulted the combined company into the second place behind IBM in the \$5.2 billion CAD/CAM market.

A Calma buy could ensure

Prime's hold on the No. 2 market slot, said Bruce Jenkins, vice-president of Datatech, a Cambridge, Mass.-based market research firm. Current Datatech projections for 1988 show Prime knocked down to third place in CAD/CAM by Huntsville, Ala.-based Intergraph, whose workstation sales are thriving as more Intergraph-compatible software emerges, Jenkins said.

He said reliable sources have told him one of the inducements being offered Prime is a lucrative GE contract for "substantial amounts" of Prime products.

OSI muscles way onto net show stage

Apple, UB, HP among vendors pledging support

BY KATHY CHIN LEONG
CNET

SANTA CLARA, Calif. — TCP/IP is real, but OSI is inevitable. That was the message hammered home to users in a barrage of double-edged vendor announcements at the Interop '88 network conference here last week.

Unlike years past, when Transmission Control Protocol/Internet Protocol vendors deliberately ignored Open Systems Interconnect because it was a rough, unfinished network protocol, major suppliers claimed in this time, underlining their dual commitment to TCP/IP and OSI.

For instance, Apple Computer, Inc. introduced MacTCP for the Macintosh operating system. Instead of unveiling it as a networking application, Apple made the product a developer's tool kit, which will be licensed for \$2,500. Apple also has an interest in OSI, since it has a 10% interest in Touch Communications, Inc., an OSI developer.

Ungermann-Bass, Inc. in Santa Clara, Calif., introduced NetOne TCP-Mac, a networking application that includes file transfer and electronic mail functions as well as a virtual terminal developed using MacTCP.

Netman fever

On the flipside of the network coin, UB boasted of its participation in the Netman demo, a 13-vendor demonstration of OSI networking protocols running on top of a TCP/IP network (C/W, Sept. 19).

Hewlett-Packard Co. took the opportunity to announce that its HP Openview network management method will manage current TCP/IP networks as well as future OSI networks.

The vendor echo of dual support for TCP/IP and OSI rings well in the ears of

users who are interested in migrating. During the three-day conference, sponsored by Advanced Computing Environments, the U.S. Navy held a workshop to discuss how users can migrate from TCP/IP to OSI.

Jeff Case, network manager and professor at the University of Tennessee, said the campus is an avid user of TCP/IP networks because it is the only solid protocol that works with a variety of vendors' products. However, "we are anxious to move to OSI and expect to do so in three

to five years," he said.

Analysts tracking the user community said TCP/IP will be around for quite some time. No one knows for sure when OSI will be a finished protocol, so analysts such as Joe Seidler at Infonetics, Inc. are confident to proclaim that TCP/IP has not reached its peak in popularity.

"It's got a long life ahead," Seidler said. "For the largest users who must plan for the future, vendors have to offer some kind of OSI plan. For today, TCP/IP is here and it works."

What will foster TCP/IP's popularity, Seidler said, is the network management

protocol called Simple Network Management Protocol (SNMP), an approved standard that was designed for monitoring TCP/IP networks. The protocol can access the same network management database as a similar protocol proposed for OSI.

During the show, several vendors announced support for SNMP and staged interoperability demonstration on the exhibit floor.

At the same time, 13 vendors staged the Netman interoperability demo to show how the OSI implementation of network management runs over TCP/IP networks. Known as Common Management Information Protocol, the draft-standard protocol was used by vendors such as HP, UB and Digital Equipment Corp.

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IAM takes the guessing game out of VSAM space allocation. Large amounts of disk space are wasted when users over-estimate how much space VSAM requires or how many records a file will contain. VSAM cannot release overallocated space.

TRANSPARENT

VSAM files account for the lion's share of disk space used in most installations. Online systems (CICS), BATCH jobs, TSO, SMP/E and other applications make extensive use of keyed index VSAM (KSDS) files.

IAM is a transparent alternative to VSAM KSDS files, which substantially reduces the impact of VSAM processing in your installation. There are no modifications to programs or JCL to use IAM files in place of VSAM.

SMF ANALYSIS

VSAM SIZE REPORT

DATA SET NAME	ALLOC TRKS	TOTAL EXCPTS
BIG CLUSTER	37195	2517003
BIG CLUSTER DATA	37190	2105001
BIG CLUSTER INDEX	85	400802
A FILE SMALLER	18640	678216
A FILE SMALLER DATA	18650	272521
A FILE SMALLER INDEX	40	408715
SMP/E TOPP223.CBI	12215	388021
SMP/E TOPP223 DATA	12200	3075021
SMP/E TOPP223 INDEX	15	805180

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Late shipments hit Tandy sales

PORT WORTH, Texas — Tandy Corp. last week said a shortage of usable components that slowed shipments of its personal computers is expected to depress revenue this quarter.

According to Ed Juge, Tandy director of product development, the impact on revenue in the first fiscal quarter ended Sept. 30 will be slight. Tandy expects to make up for any dip in sales in the following quarter, Juge added. "The bad news is that we haven't been shipping on time," he said. "The good news is that we'll sell everything we make."

Shipments of unusable components have delayed the delivery of Tandy's three newest products: the Tandy 5000MC, an Intel Corp. 80386-based system compatible with IBM's Micro Channel Architecture; the Tandy 1000TL, an Intel 80286-based system; and the Tandy 1000SL, an Intel 8086-based PC.

Introduced in April, the Tandy 5000MC began shipping in late August, nearly two months behind schedule.

DG cuts work force by 800

BY NELL MARGOLIS
CIVILIST

WESTBORO, Mass. — Data General Corp. last week struck another blow in its ongoing battle against the odds in the minicomputer market with the closing of two high-end manufacturing plants — a move calculated to cut about 800 jobs and some \$50 million in costs.

To effect the consolidations, which are expected to be completed by spring, the company took an approximate \$45 million charge against operations in its fourth quarter ended Sept. 24, according to a DG spokesman.

Market analysts generally applauded the move, which they saw as stemming from problems dogging the minicomputer sector in general rather than DG in particular.

Citing the company's avowed mission to gain and retain fighting turf, recently appointed Executive Vice-President and Chief Operating Officer Ronald Skates said, "We see ongoing and tough cost management as a way of life for Data General."

A way of life, indeed. Major-league layoffs, in aid of operating efficiency, have become an annual event in Westboro since 1982. The flow is not entirely one-way, the spokesman said. DG is "changing our employee mix from a manufacturing bias to one that reflects more of a marketing direction" and is continuing to

staff up in sales, systems engineering and research and development, he added.

Stephen Dube, an analyst at Shearson Lehman Hutton, Inc., said the latest round of cost-cutting measures will "hopefully put Data General back at par; they need to be there to pursue their new strategies."

DG management recently announced a two-pronged strategy: continued development and support of the company's proprietary minicomputer line coupled with a simultaneous advance into the Unix-based market with a high-power, relatively low-cost workstation line based on Motorola, Inc.'s superspeed 88000 reduced instruction set computing chip.

On target

The Motorola project, expected to yield its first fruit sometime next spring, is on schedule, the spokesman said.

DG's repositioning initiative has been well received by industry analysts. Minicomputers are moving in two directions: down to file-server status and up to "a new mini-mainframe class," said Joseph Payne, an analyst at Alex Brum & Sons, Inc. in a research report issued last week. "We believe that Data General will participate actively in both movements."

Whether last week's moves will improve the company's positioning with respect to the Mo-

trola-based line "depends on when the new products actually hit the market and what the world looks like then," said Suzanne Peterson Case, an analyst at First Boston Corp. In the short term, however, she referred to the move as both necessary and smart.

"Everyone keeps calling Data General a company in trouble," noted Peterson Case. "Nevertheless, they still manage to turn out almost \$1.5 billion worth of products a year."

The pattern continues

Data General's current layoffs lengthen a string of similar moves in recent years

	Data General's layoffs of late
Summer 1985:	1,300 laid off to reduce company's break-even point
June 1986:	400 laid off, with closing of plants in Hong Kong and Austin, Texas
July 1986:	500 laid off across all areas except sales, marketing, engineering and R&D because of industry slump
July 1987:	950 laid off in midst of declining sales and large losses
September 1988:	800 lost jobs in latest force reduction

CHART

Oh — DG's adding a mini, too

Data General's timing could have been better.

The company is set to announce a high-end system today that is expected to take its MV line well beyond the millions of instructions per second (MIPS) range of Digital Equipment Corp.'s high-end 8800 series.

But what could have been a sunny day for the struggling minicomputer maker will likely have a dark cloud hanging over it. The announcement comes only days after the company announced the latest in a series of job cuts (see story above).

Today's scheduled announcement, has long been expected by industry analysts. The system could take the MV product line, DG's bread and butter, into the 40-MIPS range, analysts said. The current high-end machine, the MV20000, is offered in uniprocessor and dual-processor configurations, so analysts expect the new of-

fering to expand to a four-processor configuration.

Observers said DG will use today's event to stress its commitment to the MV proprietary line. Earlier this year, the company announced plans to use the Motorola, Inc. 88000 reduced instruction set computing (RISC) microprocessor for a new line of Unix-based low-end and mid-range systems.

"Monday will be the party for current customers to keep them satisfied while DG puts its RISC system together," said Michael Geran, vice-president of research at Nikko Securities International in New York.

Geran and other analysts said the new high-end product is a good move for DG because the firm needs to provide its installed base with more of a growth path as well as show the industry that it is still healthy enough to keep DG's systems.

ROSEMARY HAMILTON

Dbase IV delayed again

TORRANCE, Calif. — If you are planning to buy Ashton-Tate's Dbase IV, don't pull the money out of your wallet just yet. The long-anticipated product has once again been delayed. Ashton-Tate said last week that Dbase IV, originally scheduled to ship by the end of July, will miss its latest deadline of last Friday. The new schedule has the product tentatively coming out of its final testing stage and into dealers' hands within the next three weeks.

Observers said the announcement should have little impact on Ashton-Tate's standing with users and the investment community as long as Dbase IV does in fact ship this month.

Dbase IV entered its last stage of testing, called the certification process, two weeks ago, as predicted by the company. At the time, Ashton-Tate Chairman Ed Eber declared, "Certification means that within one rebuild of the product, Dbase IV will be ready for production."

Not exactly. Lydia Dobryn, vice-president of marketing, said last week that Ashton-Tate developers have had to rebuild the 400,000-line application more times than initially expected. "It hasn't been as clean a process as we had expected," Dobryn said.

But Ashton-Tate chose its words carefully in a statement last week, hedging on a specific deadline. While saying it expects to release Dbase IV as early as the second week of this month, it added that it was "confident the product will ship before the end of our fiscal quarter, Oct. 31."

Ashton-Tate has drawn criticism during Dbase IV's development because it never established a formal beta-test program that sent out regular code upgrades to all test sites and solicited comments from test users. One early user characterized the testing process as "unstructured and inconsistent."

STEPHEN JONES

Shoot-out

FROM PAGE 1

the contract with Microsoft, Ashton-Tate can distribute SQL Server through resellers, which would apparently include Novell dealers.

Irking Microsoft in particular was Ashton-Tate's willingness to provide Novell with technology so that the latter company could "support" both Ashton-Tate's Dbase IV and the Sybase SQL database server. That would have spared Novell the trouble of reverse-engineering the Sybase server, the source close to Novell said.

On the warpath

While Microsoft knew that Ashton-Tate had planned to formalize its relationship with Novell, Gates did not find out until last week that the deal included an exchange of SQL Server technology. At that point, Gates' temper flared, knowledgeable sources confirmed.

Although Ashton-Tate had not promised Novell access to any Microsoft code, Eber backed down rather than "irreparably" damage the firm's relationship with Microsoft, a source

familiar with the dispute said.

Novell and Ashton-Tate issued a press release saying the cancellation was an amicable one and that the duo will continue to work together. "Circumstances caused us not to go through with the announcement," said Craig Burton, an executive vice-president with Novell's Software Group. He declined to comment further.

For its part, Microsoft said little except that its "relationship with Ashton-Tate is stronger than ever." Gates was unavailable for comment, and Microsoft declined to confirm the breakdown.

The announcement debacle could not have come at a worse time for Ashton-Tate, which has been under great pressure in the last 12 months, thanks to product bugs, shipping delays and an increasingly wary developer community (see story this page). For Ashton-Tate, SQL Server will both produce new revenue and help bolster Dbase IV, which will also function as a front end to the server. Novell was to have been simply another key distribution partner.

For Microsoft, SQL Server is an ace in the hole for positioning Microsoft's upcoming

OS/2 LAN Manager protocols as a standard. "Gates wants the SQL server to be sold on LAN Manager systems only," one source said. In fact, both LAN Manager and SQL Server product managers at Microsoft report to the same boss.

Plot twist?

Ironically, some observers argue that the Novell-Ashton-Tate alliance would benefit Microsoft. Had the deal gone through, it would have guaranteed Microsoft and Ashton-Tate access to Novell's installed base of 2.5 million nodes, measurably boosting SQL Server as a leading database management standard.

In addition, Novell was expected to alter plans for its own SQL-based server that is still slated to ship in the fourth quarter.

The deal with Ashton-Tate would not only have ensured Novell's support for the Sybase SQL server, but Novell would reposition its own SQL project as a network administration server rather than position it directly against SQL Server, sources close to Novell said.

West Coast correspondent Stephen Jones contributed to this report.

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NEWS SHORTS

AT&T nixes report

AT&T adamantly denied last week a published report claiming the company would toss aside Sun Microsystems, Inc.'s Scalable Processor Architecture, or Sparc, in favor of another reduced instruction set computing (RISC) microprocessor, the Motorola, Inc. 88000 chip. A spokesman claimed the report was incorrectly pieced together from several innocent incidents, such as the presence of salesmen from Motorola and Intel Corp., both established suppliers to AT&T, in AT&T lobbies. AT&T Bell Laboratories, he said, is researching an assortment of RISC chips for possible product development that would take place years from now.

IBM ships biggest model

IBM announced Friday the first customer shipment of its most powerful system, the Enterprise System/3090 Model 600S. The system went to CSX Technology, a division of transportation company CSX Corp., where it will be used to manage communications and computing systems at the CSX data center in Jacksonville, Fla., and will link more than 17,000 workstations over a 20,000-mile rail network.

Ramtek seeks court shelter

Troubled computer-graphics systems maker Ramtek Corp. has filed for reorganization under Chapter 11 of the federal bankruptcy code. The Santa Clara, Calif.-based firm has installed a new management team in an effort to return to profitability and said one significant cost-cutting measure will be a move to smaller headquarters. Founded in 1971, Ramtek employs 300 people and primarily serves OEM customers such as Unisys Corp.

Disk-dumping charged

The U.S. Department of Commerce last week announced a preliminary determination that Japanese firms are selling 3½-in. diskettes in the U.S. at prices that are 22% to 54% below fair-market value. A final decision in the dumping case, filed by Verbatim Corp., is expected by Dec. 7 and could result in import duties that raise the price of Japanese microdisks. Targets of the investigation are Sony Corp., Hitachi Maxell, Ltd., Fuji Photo Film Co. and other Japanese suppliers.

DBMS machine from Honeywell Bull

Honeywell Bull rolled out a database machine last week tailored for its GCOS 8 mainframe customers. The Relational Database Computer (RDC) is based on a Teradata Corp. database machine. The system is priced from \$365,000 and can also be leased; an entry-level version allows users to store up to 2G bytes of data, and the system can be expanded to one terabyte of data, company officials said. The Relational RDC can be hooked up to as many as 16 Honeywell mainframes.

Three million and counting

IBM announced last week that worldwide shipments of its Personal System/2 line had reached three million. The system that reached the milestone, a Model 50Z, was shipped out from IBM Australia Ltd.'s manufacturing plant in Wangaratta, Victoria, and is being delivered to the Australian Small Business Association for presentation to that group's "Innovator of the Year," who will be honored in ceremonies in November.

X/Open rep departs

Robert Ackerman, chief spokesman for the X/Open Consortium, Ltd., resigned recently to launch his own consulting firm, which will provide clients with — guess what? — advice regarding open systems. Ackerman, who has spent the year traveling around the U.S. and Europe promoting X/Open, said he had planned to start his own firm before joining X/Open. Ackerman said Bill Bonin, who headed up the independent software vendors portion of X/Open, will become head of the group's U.S. operations.

OSF makes first cuts on interface submissions

BY AMY CORTESE
OF STAFF

There was no news about AT&T joining, but the mood was upbeat at the Open Software Foundation's (OSF) first general membership meeting last week.

The companies submitting technologies, especially the smaller ones, had the air of Olympic hopefuls dreaming of making it big.

Twenty-three entries out of 40 total submissions met OSF criteria for a potential standard user interface for the group's planned version of Unix; these proposals will be reviewed further in the next four weeks.

Among those that made the cut were Digital Equipment Corp., Sequent Computer Systems, Inc., AT&T, Apollo Computer, Inc., Digital Research,

could be either a complete user interface from one source or a combination of discrete technologies from various sources.

Although OSF members will give their input at a meeting scheduled for Nov. 2-4, it is the OSF staff that will make the final decision at some point afterwards.

Although an announcement regarding AT&T was widely anticipated, at a press and consultants' briefing after the membership meeting OSF officials stated that negotiations with AT&T are still under way and that they were optimistic.

Also at the briefing, John Paul, the OSF's director of development, responded to the constant requests for a timetable and outlined the OSF's agenda for product delivery.

In November, the OSF will receive evaluation code from IBM, which is preliminary code that will eventually make up Release 3 of IBM's AIX. The OSF has said it will base its product on AIX; however the group also stated that that could mean anywhere from one



OSF President Henry Craus

inc. and a joint submission by Hewlett-Packard Co. and Micro-soft Corp.

It is yet to be decided whether the winner will get the gold or share the limelight with silver and bronze, representing more of an alloy. OSF officials have stated that the final selection

line of AIX code of all of it.

In March 1989, the initial code will be delivered by IBM, and in July 1989 the final code will be delivered by the OSF, with products becoming available sometime in the second half of 1989.

One of the OSF's major ef-

forts will focus on developing an architecturally neutral distribution format, which will allow a common version of the software to be distributed on any hardware platform.

Henry Craus, president of the OSF, also announced three permanent additions to its staff, making a total of six permanent staff members among the 69



Goldstein, newly appointed OSF vice-president of research

transients. Ira Goldstein, one of HP's leading technologists, was appointed vice-president of research. Donald O'Shea was named vice-president of operations and communications. O'Shea was formerly chief executive officer of Unisoft Systems Corp. Patricia Van Blarcom was hired from Apollo to serve as controller.

In separate announcements, the OSF last week picked up steam with the addition of Hitachi Ltd. of Tokyo as a new sponsor, as well as 10 new members. Hitachi's joining marks the OSF's sixth sponsor and its first from the Asia-Pacific region.

New members included Advanced Micro Devices, Inc., Boos, Allen & Hamilton, Inc., Micro-Interlan, Inc., Norsk Data AS, Pacific Bell, Silicon Graphics, Inc., Stanford University, The Swedish Telecom Corp., Wang Laboratories, Inc. and B&Open Consortium Ltd.

CDC ropes in ETA president for itself

BY JEAN S. BOZMAN
OF STAFF

MINNEAPOLIS — Control Data Corp. last week moved ETA Systems, Inc. President and Chief Executive Officer Carl S. Ledbetter Jr. into the newly created position of vice-president of marketing and sales for CDC's Computer Products Division. The developments came as the \$3.4 billion computer vendor anticipated a third-quarter loss in earnings due to sagging mainframe sales.

The move leaves ETA Systems, a supercomputer subsidiary of CDC, with ETA designer Lloyd Thornध्ये as chairman. In effect, CDC has called home an estimated \$200 million investment in ETA, because Ledbetter now has the task of directing sales and marketing for both

ETA supercomputers and CDC Cyber mainframes.

Company spokesmen put the best face on the change, which leaves ETA Systems without a president. "What we're doing is putting Carl's strengths where we need them most right now," company spokesman Tom Charnold said. "He will be coordinating marketing and sales for our entire computer line." ETA's vice-president of operations, Al Moeschner, will take on Ledbetter's responsibilities for ETA technical development and administration.

Ledbetter's move parallels the creation of CDC's Computer Products Division in June, Charnold said. The June reorganization combined responsibility for Cyber mainframes, engineering workstations and ETA supercomputers under Gil Williams,

the division's vice-president and general manager.

Before June, Ledbetter had reported to Thomas Roberts, CDC executive vice-president and president of the division — then called the Computer Systems and Services Group. Since June, Ledbetter had reported to Williams, the spokesman said. "We created an umbrella organization so that supercomputers, workstations and mainframes could be handled together," Charnold said.

Ledbetter, who is about 40, has taken a direct hand in selling the ETA systems, which have been shipping since 1987. A former IBM senior scientist and Prime Computer, Inc. vice-president, Ledbetter has been credited with making ETA a viable competitor with Cray Research, Inc. supercomputers.

Pillsbury gets brushed by CIO revolving door

BY JAMES CONNOLLY
OF STAFF

Forget about chief information officer being the job of the future. The big money will be in the overtime paid to maintenance personnel who enrich the nameplates for the offices of corporate America's constantly changing cast of CIOs.

The latest well-known CIO to shift jobs is John M. Hammit, vice-president of information

motion of senior vice-president of information services Edward Boudreau to president of the John Hancock Advisors, Inc. subsidiary. Meanwhile, Chemical Bank promoted Barbara D. Caplan to chief technology officer from senior vice-president in charge of financial services.

In and out

Those changes are the latest in a string of 1988 CIO shifts that include the departure of Kevin Moody from Gillette Corp., Joseph Brophy's move into The Travelers Corp.'s employee benefits group and Michael Simmons' shift from Fidelity Investments to BankAmerica Corp.

But despite the attention paid to CIO turnover, observers said last week it remains unclear whether turnover is greater or just more noticeable this year.

A consultant who deals with MIS executives, The Debold Group, Inc. Senior Vice-President Michael Webber, said that if turnover is higher, the increase may be attributed to the number of corporate takeover attempts.

If successful, takeovers can turn an MIS group into excess baggage. Even if a company defends against a takeover, as Gillette did, the cost can mean cutbacks in budgets and disenchantment at the CIO level.

"I don't have any hard numbers, but if you look at a list of the 100 largest MIS budgets and the so-called CIOs in those organizations, there is a large amount of movement out there," Webber



United Technologies' Hammit

noted. He said he also senses that some of the activity involves a drive into CIO-type positions by executives with little MIS background but extensive general business experience.

Jim Hall, a principal at Cambridge, Mass.-based Index Group, Inc., also cited the trend toward nontechnical CIOs and noted that the result for those

with strictly MIS backgrounds could be a lateral career path into MIS jobs.

"I think there is a lot more flux in IS in general this year. I can see it just in the amount of business and the type of business we have," Hall said, noting that companies are restructuring the information systems group because of the merger wave and the 1987 stock market crash.

At Pillsbury, Hammit credited his predecessor, Wilson, with "unfreezing" the corporate attitude toward information systems. "He found a situation where information technology was thought of as an expense," Wilson said. "He had to make sure senior management understood the capabilities of information technology and how it could contribute to the bottom line."

Wilson has spent most of his life in MIS and strategic planning. "I came up through the

MIS ranks, starting right out of high school as a third-shift electronic accounting machine and computer operator. I have sat in virtually every position in the business," said the 41-year-old Ohio native. He spent several years with PepsiCo, Inc. and Centex in Minneapolis.

The CIO changeover at John Hancock was driven by the planned 1989 retirement of Vice-Chairman R. Bruce Oliver, who serves as chief executive officer of John Hancock Advisors.

Boudreau took charge of John Hancock's MIS group less than two years ago after serving as corporate treasurer and president of the company's retail banking subsidiary. Boudreau supervised the decentralization of John Hancock's systems development efforts, which included reassignment of developers to business units. No successor was named.



management at Pillsbury Co. Hammit left the job conglomerate for a similar position at United Technologies Corp. Hammit began work as vice-president of information systems at United Technologies last week.

Hammit's responsibilities at Pillsbury will be assumed by Carl Wilson, vice-president of MIS at Pillsbury's U.S. foods group.

Hammit's relocation came on the heels of John Hancock Mutual Life Insurance Co.'s pro-

DEC clues hidden in VMS?

BY WILLIAM BRANDEL
OF STAFF

A file buried in the latest version of Digital Equipment Corp.'s VMS operating system provides new evidence that DEC plans to broadly expand its line of symmetrical multiprocessing computers as it continues its drive into IBM's transaction processing turf. The file lists as yet-unannounced VAX models that industry analysts said include an eight-processor version of the VAX 6200 series and an assortment of workstations.

Among the unannounced product names listed in the file are the VAX 6250, 6260, 6270

and 6280. DEC's current 6900 product line spent four models, from the 6210 to the 6240. This series incorporates one to four CPUs with 2.6 million instructions per second (MIPS) and was specifically designed for VMS 5.0's multiprocessing capabilities, essential for transaction processing on a VAX.

The new model numbers indicate that this series will be expanded to a five- and six-processor offering by year's end to meet customer demand, according to Hans Marquardt, an analyst at Framingham, Mass.-based International Data Corp.

A DEC spokesman denied that the file is a VAX/VMS prod-

uct list, saying it is actually "comments made by engineers who develop and maintain the code in VMS 5, which should have been deleted."

The VMS file also lists a VAX 6205 series ranging from a VAX 6215 to a 6285. Analysts said the numbers apparently refer to field-upgrade 4- to 6-MIPS processors that DEC is expected to introduce as boosters for the VAX 6200 series early next year.

The file lists six different configurations of a product called Pireox. Analysts said Pireox is the code name for DEC's first multiprocessing workstation, which they expect to come out around year's end in conjunction with a symmetrical multiprocessing version of Ultrix-32.

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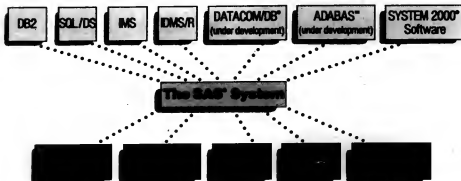
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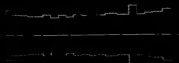
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Software rental furor

Test drive or license to pirate? Publishers, sellers disagree

BY MICHAEL ALEXANDER
OF STAFF

Should companies and consumers be allowed to rent computer software?

No, say software publishers who claim that rentals are merely a front for software piracy.

Yes, say retailers and mail-order firms that claim the practice will enable companies and consumers to try software before they buy.

Software rental is legal, but a bill under consideration by the Senate Subcommittee on Patents, Copyrights and Trademarks may close what some say is a loophole in the copyright law. The Computer Software Rental Amendment of 1988, introduced last month by Sen. Orrin Hatch (R-Utah), would amend the U.S. Copyright Act to block unauthorized software rentals.

Try, try again

The bill is the latest attempt by the software industry to prohibit rentals. With Congress preparing to adjourn in October, however, the chance of the bill's passing is remote, said Ken Wasch, director of the Software Publishers Association. Plans are already under way to submit yet another bill in January, he said.

The software industry is not certain how much of its revenue is lost to piracy as a result of software rentals, which is one reason there has not been broad industry support for the current bill or similar ones submitted to Congress in 1984, 1986 and 1987. Until last year, the software industry was content to rely on the shrink-wrap license routinely packaged with computer software as its primary defense against rentals and illegal duplication of software.

In March 1987, a federal district judge tossed out a Louisiana law that validated shrink-wrap software licenses, saying the legislation violated a copyright law that lets users make backup copies.

Another reason the industry has not taken software rentals more seriously is that the business has been a rather small and isolated problem, said Jeff Tarter, editor and publisher of "Softletter."

"I have never heard of any software rental company that has ever made any money," Tarter said. "Several companies have tried it but went bankrupt before the lawyers could attack."

The risk that someone will figure out how to do it is mounting, he added.

Legal observers predicted a law will be passed that will prohibit software rentals, if for no other reason than that the economics of the computer software business mandates a legal solution. Unlike the video rental business, in which consumers are not as apt to duplicate prerecorded movies, it is remarkably easy and inexpensive to copy software.

"In order to encourage companies to invest in new products and expend their

creativity, the creator has to be assured that he will recover the cost. Locally [in the Boston area], there is a store called Unitech that gives away public domain software when you buy equipment," said Lee Gesmer, an attorney at Lucas, Gesmer and Updegrave in Boston. "Can you imagine what would happen if stores like that sprang up coast to coast and rented Lotus' 1-2-3, Wordperfect and dBase III? There would be a vast distribution of illegal software that would cost the industry billions and billions of dollars."

Software publishers have never been able to substantiate their claims of piracy from software rentals, countered Real Provencher, president of Software That Fits, a mail-order firm in Humble, Texas.

His firm does not rent software, he

said, but offers a "trial purchase" to end users who want to try software before they buy. The buyer has 16 days to evaluate the software for an amount approximately equal to one-third of the purchase price. The company sells Aldus Corp.'s Pagemaker 3.0, for example, for \$429 and offers it for trial purchase for \$113.

Software rental goes a long way toward reducing piracy, Provencher said: "Up until software rental became available as a mode to try software, the only way to do it was make a copy. There would not be a need for software rentals if software publishers were required by law to provide a money-back guarantee."

"Would you pay a third of the purchase price of a program to rent it for a week just to check it out?" Tarter said.

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Software AG unleashes tools

BY AMY CORTESE
CW STAFF

NASHVILLE — Software AG of North America, Inc. announced a slew of new and enhanced products at its annual users conference here last week, along with support of a new hardware platform.

The company announced an Apple Computer, Inc. Macintosh-based front-end computer-aided software engineering (CASE) tool; text processing software for IBM environments; performance enhancements for Adabas, its database management system; and enhancements to fourth-generation language performance

and security capabilities for its Natural on the Digital Equipment Corp. VAX. The firm also announced availability of its database, language and CASE tool software on Wang Laboratories, Inc. VS environments.

The company introduced two products that make up an integrated database/communications high-performance environment for Adabas. The High Performance Environment (HPE) and Adabas Transaction Processing Facility (TPF) were designed to integrate database management and transaction management; this is similar to the concept of IBM's DB/DC environment.

Both products will be available in the fourth quarter, the vendor said. Adabas TPF is priced from \$5,700 to \$34,000, and Adabas HPE is priced at \$36,000 for IBM's MVS and 15% higher for IBM's ESA.

The move to the Wang VS environment is more significant to Software AG's European business, said Scott McLarnon, director of software at International Data Corp. in Framingham, Mass. The Wang environment is used much more as a general-purpose business machine in Europe, where Software AG is very strong, he said.

The database products are set to be available on the Wang this month, with prices ranging from \$3,000 to \$60,000, depending on product and platform.

Xerox leaps into presentation fray

BY STEPHEN JONES
CW STAFF

SAN DIEGO — Desktop publishing giant Xerox Corp. just week-end its vote of support for the desktop presentation market by announcing Xerox Presents, a software program that makes flashy business presentations.

Xerox Presents is a Microsoft Corp. MS-DOS version of a similar graphics product from Cricket Software, Inc. that runs on Apple Computer, Inc.'s Macintosh. Cricket, content to stick with the Mac, agreed to give Xerox worldwide marketing rights to versions of its products that run on DOS- and OS/2-based personal computers.

The \$495 program is aimed at business users who want sharp-looking overhead transparencies or slides but do not have the time or talent to produce such presentations. Xerox Presents ships with a runtime version of Microsoft's Windows, which provides what-you-see-is-what-you-get screen displays of graphics. Users can take shortcuts in creating a slide by using automated style sheets with preset colors, fonts and layouts.

May be a jolt

Xerox's announcement comes on the heels of Alphas Corp.'s entry last month into the desktop presentation business. The recent addition of these two desktop publishing leaders could help jump-start the desktop presentation market, which has not met expectations of greatness.

"Not a lot has happened after all the hoopla over desktop presentations last year. But if anyone had doubts whether the desktop presentation business was real before, these announcements should answer that," said Craig Cline, associate editor of the "Seybold Report on Desktop Publishing."

Xerox made a big splash in desktop publishing by acquiring marketing rights to Ventura Publisher, but the company has not developed or acquired any additional products.

With plans to market other Cricket products, including Graph and Draw, Xerox has bought its way into another graphics market. "The combination of Cricket's products and Xerox's marketing clout could result in a real winner," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.

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IBM storage boost seen halfhearted

BY ROSEMARY HAMILTON
OF STAFF

IBM put some potholes on both its 3480 tape storage and 3990 storage controller lines last week, but analysts said the move was a halfhearted attempt to improve the products.

On the tape storage front, IBM cut prices on all 3480 models by 12% to 17% while also boosting the performance of the 3480 Model A22 control unit. In addition, the company sketched out some plans for future 3480 performance improvements that should turn into real products sometime next year.

At the same time, IBM moved the delivery date of its 3990 Model 3 with cache capability to mid-December. Earlier this

year, IBM said it would meet its 1988 third-quarter shipment date for this controller and would instead begin shipping it in the first half of 1989.

While the new date is an improvement, the Model 3 will not be shipping with Extended Features, which should really make the product him, according to analysts.

Extended Features, which consist of the DASD Fast Write and Dual Copy capabilities, will ship under an Early Customer Support Program sometime in the first half of 1989. With that schedule, observers said, it will likely be late 1989 or early 1990 before users see a fully functional Model 3.

However, William Noble, IBM's manager of storage prod-

ucts marketing, said the model shipping in December is a functional product with cache capability and should not be considered partially complete.

Not fully functional

"It's absolutely not fully functional," said David Vellante, director of storage research at International Data Corp. in Framingham, Mass. "It would be difficult for us to recommend the purchase of a Model 3 without the Extended Features."

DASD Fast Write would allow data to be sent at channel speeds to cache and battery-powered storage. This eliminates the need to transfer data to a direct-access storage device immediately, as is now required. Dual Copy allows a user to create two

copies of data, one of which can serve as a backup. Both are automatically updated, and the second is immediately available if the first is lost, IBM said.

The 3480 announcements, analysts said, were expected responses to competitors such as Storage Technology Corp.

"It was only a matter of time before IBM cut prices to put a squeeze on," said Michael Peterson, president of Peripheral Strategies, Inc. in Santa Barbara, Calif. The 12% to 17% cuts apply to the Models A11, A22, B11 and B22 as well as other components in the 3480 Magnetic Subsystem product line, including the Automatic Cartridge Loader. With the new pricing, for example, the A22 will sell for \$56,930, compared with the

product's earlier price of \$68,590.

The A22 will also get two performance improvements, which should be available by mid-November. The control unit's data rate will be increased from 3M to 4.5M char./sec., while its buffer storage will be doubled from 1M to 2M bytes.

Current A22 users can pick up the new features for \$5,500. After Nov. 18, the A22 will ship standard with those improvements.

Meanwhile, IBM sent a cryptic message to customers that bigger and better things will be available next year for the 3480 product line.

IBM's Noble would not provide details, but he said that the company intends to increase the data cartridge capacity 300% to 500% and to boost the tape subsystem's overall performance as much as 50%.

Oracle squeezes into the crowded applications market

BY AMY CORTESE
OF STAFF

When Jeff Walker, founder of Walker Interactive Systems, joined Oracle Corp. in December 1985, the signal should have been clear. However, nearly three years later, as Oracle announced its entry into the financial products market, many were surprised.

Oracle launched its assault on the financial applications market Tuesday with the introduction of Oracle Financials, a suite of four accounting packages consisting of General Ledger, Payables, Purchasing and Assets. The products are available immediately for Digital Equipment Corp. and Sequent Computer Systems, Inc. machines.

Walker, senior vice-president and chief financial officer of Oracle, spearheaded the effort. His former company, which still bears his name, came to fame with accounting applications for IBM mainframes.

According to many, the financial products market is a mature and saturated market. Certainly it is a crowded one.

However, Oracle's Walker said he sees a parallel between the accounting software market today and the database management system market five years ago: old technology, dominated at the high end by large, well-entrenched vendors and fragmented at the mid-range with no real dominant leader.

Oracle hopes to capitalize on what it sees as a trend of large organizations moving off mainframes to smaller and more powerful machines and shifting to more decentralized management styles. Simply put, Oracle is hoping to do to the accounting market what it has done to the database market.

It will start by selling into its largest customer base: DEC VAX users. Sequent was also chosen as an initial platform because Oracle has been running the software for its own use on Sequent machines for a year now.

Oracle reported that it intends to eventually offer the

software on all platforms that run the Oracle DBMS. According to Walker, it takes only two weeks to port the software to a new environment.

Aggressive growth plans

The announcement marks the latest move in Oracle's aggressive growth plans. In the past year, the company entered the computer-aided software engineering market with new software tools and announced several marketing agreements, support of new platforms, a major release of Oracle and the establishment of a systems integration subsidiary. Oracle last week reported a 120% increase in its

first-quarter earnings compared with the previous year's quarter.

According to Oracle, there are currently 15 customers who also have tested Oracle Financials. They include Sequent in Beaverton, Ore., Burlington Coat Factory Warehouse Corp. in Burlington, N.J., and the Tootsie Roll division of Charming Co. in Chicago.

Pricing for Oracle Financials depends on the hardware platform and is priced the same as the Oracle database kernel. The current VAX and Sequent prices will range from \$4,000 to \$166,000. Future IBM mainframe versions will be priced at up to \$180,000.

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For users, SX spells success

BY ALAN J. RYAN
and JULIE PITTA
CW STAFF

HOUSTON — Three months after the debut of Intel Corp.'s 80386SX chip set, Compaq Computer Corp. and NEC Information Systems, Inc. are the only personal computer vendors to introduce systems based on the hybrid microprocessor. However, industry watchers predict that others will soon follow and that SX-based PCs will eventually displace their 80286 predecessors.

Early users of Compaq's Deskpro 386S — unveiled in June, coinciding with the announcement of the SX microprocessor — said they have been pleased with its performance. Compaq officials said the introduction is the most successful in the company's history, although they declined to offer shipment figures.

With the recent entry of NEC, interest in the new class of 386 appears to be growing. A number of users said they are testing the systems as a possible alternative to the 286. Luring them is the PC's ability to run 386-based applications software at a price competitive with high-performance 286 systems.

"The price is not much more than the Deskpro 286, and you gain more functionality," said Janet Zickert, division manager

of professional computing services at Continental Bank in Chicago. Continental Bank has purchased about 200 Deskpro 386S systems, using them to replace IBM 3270 terminals at the bank. That project was begun last year with the Deskpro 286.

Zickert jumped to the Deskpro 386S because of its ability to run 386-based applications software.

The 80386SX is a 32-bit microprocessor that allows it to run 386-based software packages. However, it uses a 16-bit external data bus — like its predecessor the 286 — rendering it less expensive than the average 386 because it requires

fewer components as well as less board space.

Industry observers have said that systems based on the 386SX may eventually cost less than \$2,500.

Creates bottleneck

However, the system does have its drawbacks. The 16-bit external data bus acts as a bottleneck to performance. A 386-based package will run slower on a 386SX-based system than a traditional 386 system.

Zickert said she will avoid purchasing the 386SX systems for users who need maximum processing speeds. However, in tests of the 386S, it runs faster than the high-performance Deskpro 286, she maintained.

Michael Bryant, senior tax manager at Peat, Marwick, Main & Co., has also purchased Deskpro 386S systems to replace 286-based systems. "It's certainly a bargain," he said.

Cheryl Currid, manager of departmental computing at Coca-Cola Foods, said her company has standardized on the Compaq Deskpro 386/20. However, she said she expects to purchase some Deskpro 386S systems for less demanding applications.

"I think the 386S is preferable to any 286 if one were to be considering buying a high-end 286," Currid said. "We've put it on my vice-president's desk and he is very pleased with it. It was a nice benefit to put a less expensive machine there and give the 20-MHz system to a power user."

Tandem plans to offer Mac with Nonstop tie

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. expects to offer Apple Computer, Inc.'s Macintosh workstations that connect to its line of Nonstop on-line transaction processing machines by early next year. Tandem did not say how users who already have Macintoshes and want Tandem connectivity will upgrade.

Tandem and Apple agreed last week to allow the former company to sell, support and service the Macintosh. Currently, Tandem offers PSX workstations with Microsoft Corp. MS-DOS operating systems. Unlike the PSXs, which are manufactured by Wyse Technology, Inc., the Macs will retain the Macintosh label.

"We will have a variety of LANs and connectivity products," said Rich Mironov, Tandem's Macintosh product manager. He said that currently the only way a Mac could talk to one of Tandem's computers is in a dial-up mode or through asynchronous point-to-point connections.

He said that Tandem will modify both hardware and software in the Mac to allow for transparent connectivity.

Users who have Macintoshes and want the connectivity to Tandem may be able to trade in or upgrade their workstations, but Tandem has no definite plans, according to Mironov.

Mironov would not say whether Tandem has similar plans in the works for other companies' workstations, such as Unix-based models from Sun Microsystems, Inc.



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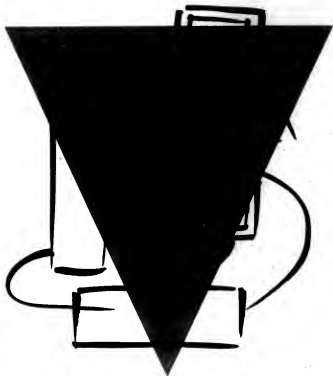
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EDITORIAL

Whatever it takes

SLOWLY BUT SURELY, the computer industry is shedding its "not invented here" syndrome. The headlines last week provided further evidence. IBM, according to customer pressure, made Open Systems Interconnect a member of its exclusive Systems Application Architecture club. General Motors and Boeing announced they would yield active leadership of the Manufacturing Automation Protocol/Technical and Office Protocol standards drive to a consortium of user firms. And AT&T dropped another hint that it is about to give up its effort to own Unix System V and cast its lot with the Open Software Foundation.

The theme of all this activity was summed up by IBM Vice-President William O. Grabe, who said IBM is prepared to do "whatever it takes" to give customers multivendor connectivity. That is quite a change for the company that only two years ago was regarded as the gatekeeper of proprietary architectures. What a refreshing concept — that users can overwhelm vendor resistance and force the move toward openness.

The list goes on. DEC, no fan of Unix, has maintained a steady enhancement schedule for its Ultrix operating system under the crush of customer demand. Users also forced DEC to reluctantly support the MAP standard. IBM once refused to even acknowledge Unix's existence; today, it purports to be its biggest fan. The rush by database software vendors to the SQL standard was as rapid as any this industry has seen in a long time, despite the hemorrhaging some suffered by shedding their proprietary products. Even the fragmented computer-aided software engineering industry has imposed enough discipline on itself to launch a standards effort before things begin to get out of hand.

Users should take this trend as a compliment. It was not that long ago that vendors peddled their own home-brewed approaches to office automation, manufacturing, local-area networking and the like. Buyers collected incompatible computers like baseball cards. It is not unusual to find sites today running systems from eight or 10 different manufacturers, each chugging away in blissful isolation.

Technology has solved part of that problem; faster CPUs have made it less important for value to be added in specially tuned operating systems. Packaged software has forced the market to narrow its options for operating platforms. But users have been the real driving force behind the accelerating standards effort. No longer content to be stuck with white-elephant machines, they are increasingly telling their vendors to get compatible or get out. The pressure may drive some vendors to the financial brink: Wang, Data General, Apollo Computer, Cullinet and Computer Corporation of America are just a few that have buckled under the standards onslaught. But we hope the result of this cleansing process will be a heightened awareness by vendors that standards should be a precondition, not an afterthought; and that what the buyers think really does count.



LETTERS TO THE EDITOR

Check 'em out

While James Alterbaum deals effectively with the problems of source-code escrow in case of vendor bankruptcy [CW, Aug. 15], I believe the real issue remains unidentified. Purchasers should not be expected to wait for a declaration of bankruptcy to protect the vital operations embodied in software. User suffering will probably begin many months or years earlier as vendor performance declines. Unanswered telephone calls and meetings frequently canceled at the last minute may be signs of serious business turmoil.

If a software purchaser and licensee cannot get source code within the terms of the negotiated contract, an escrow based on bankruptcy is not an adequate alternative. The agreement should specify performance-related factors to determine whether the vendor is effectively in business, such as response times to communications, which can be verified empirically. I have seen users tortured by anarchic vendor behavior that did not meet legal definitions of business dissolution or termination.

Alan Gettelhoff
Seidman & Seidman
New York

Red herring

All the moralizing and hand-wringing in the world won't do any good unless those who are responsible for the security of computer systems and the data that resides on them take adequate precautions to ensure their integrity. I refer to your editorial "Playing with fire" [CW, Aug. 15] on hackers, the page 1 article on viruses and related articles that have appeared

during the past few months.

I am concerned that your stories about hackers, who are just talented amateurs, are distracting attention from professional criminals whose exploits may not be as well known but whose threat is much greater.

Anyone who merely keeps his system hacker-proof has been lulled into a false sense of security.

Philip B. Wettersten
Chillicothe, Ohio

Really at fault

If you examine the record of the prosecution of security crimes and/or the investigation of these crimes, you will find that the prosecutors are the primary reason the misdeeds are not held responsible. Most (if not all) chief prosecutors have no idea how to develop and present a case involving computers, and there is no glamour in prosecuting a computer criminal.

Prosecutors are a special breed of lawyers, and I doubt that there is any one group less interested in hardware and arcane software concepts.

Those most responsible for the greatest theft of constitutional rights ever perpetrated on Americans — the loss of everyone's constitutional right to privacy — are the programmers, systems analysts and information systems managers. This great theft is accomplished by the overwhelming invasion of privacy that information systems managers and computer guardians in general are fostering.

Governments and private industry cannot steal our constitutional rights if the computer specialists will not let them. Why do we allow anyone to sell comput-

er-generated mailing lists with complex personal identification attached? Why haven't we in the professional ranks of computer guardians refused to cooperate when some credit bureau manages its files and produces a personal buying history for sale to the highest bidder? Where are we when state motor vehicle bureaus provide detailed personal information to any bidder?

Larry A. Brown
New York

Question of honor

You disappoint true "hackers" with your corruption of the use of the word [CW, Aug. 15]. Time was when hacker was an honorable title given to those who hack at their systems in quest of perfection. A more descriptive word for the criminal you mention is "cracker," meaning one who breaks into the systems. "Computer enthusiast" or similar euphemisms are hardly as elegant or concise a description of these gifted people.

Richard E. Stabo
Mayfield Heights, Ohio

A novel solution

In regard to your editorial "Playing with fire" [CW, Aug. 15], I also hate intruders... and viruses. Why not plant a virus that only infects intruders?

Ren Willis
Hughes Aircraft Co.
Fullerton, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Lohrman, Editor, Computerworld, P.O. Box 9171, 375 Commonwealth Road, Framingham, Mass. 01701.

Teaching us old dogs ain't easy

MICHAEL COHN



Thursday, 8:20 a.m.
I can think of just two reasons why I could be out of the office and be sorry about it.

Getting a cavity filled by a much-too-recent graduate of dental school is one of them.

Enduring one more of these high-tech training classes is the other.

All this corporate education has taught me one thing — always arrive at your destination early so you don't have to sit in the front row.

8:42 a.m.
"Good morning! Glad you could make it. If you haven't already done so, I'd like you to please print your names on the test cards in front of you..."

Boy, am I glad to have these test cards. How else would I be able to find my seat when I come back from lunch?

Or is this just in case the chief executive officer bursts into the

classroom and has to find me right away?

Why, I think I'll just take this test card with me when class is over and put it on my office desk.

8:50 a.m.
"Before we get started, let's take a few minutes to go around the room and have everyone say a little bit about..."

Someday, I'm going to write down a hilarious, but inspiring, three-line descriptive phrase on what I do, why I am in this class and why I really wish I had gone into the tube business with my brother.

But for now, I'll have to wing it. If I go last, I won't hear anyone else's little speech because I'll be frantically trying to think of what to say. If I go first, I won't hear anyone else's speech because I'll be too busy trying to figure out if I sounded like an idiot.

11:18 a.m.
"Heavens, I barely noticed the time! Should I go on, or would you folks like to take our first little break?"

By now, those first two cups of coffee have worked their way into the same part of everyone's anatomy.

3:20 p.m.
"Let's carefully go over the charts on pages 210 through 269."

I am now extremely familiar with several members of this class.

There is the Authority. She knows twice as much about this subject as does the instructor, and she has not been too intent on keeping this a secret.

She has corrected the instructor a dozen times since lunch. Coincidentally, she is the only person in the front row.

In close competition with the Authority is the Asker. He somehow has maintained an impressive rate of about six questions per hour. "What does this acronym mean?"

"Will this work during an eclipse?" "Will you explain that again, so I can act like I understand it?"

In the meantime, the room has finally cooled down to a more bearable 105 degrees Fahrenheit. The Sleeper across the aisle is face down on the handouts — probably on the page we went over two hours ago.

5:38 p.m.

"I guess this is a good stopping point. Let's all stay an extra 45 minutes and finish the exercise in the back of the book. We'll start again tomorrow at 8:30 a.m."

There is a high-tech expression that loosely translates, "I am out of the classroom is a rotten egg."

Friday, 8:45 a.m.



JOHN MARONEY

The single-vendor rule nears the end of its reign

AMY WOHL



For once, customers and vendors agree. The trend is clearly steering away from single-vendor, monolithic systems and strongly leaning toward more flexible, user-acceptable, multivendor systems.

Multivendor systems are generally a good idea. Advantages can include the following:

- Optimizing each work group's equipment to that group's needs. Financial analysts get big, networked personal computers with lots of communications for data access and memory and processors for large-scale manipulations; engineers get engineering workstations, optimized around graphics and numeric calculations. Vendors and processors are selected for their talents and capabilities in areas like transaction processing, manufacturing and office automation.

Wohl is president of World Associates in Bala Cynwyd, Pa., and editor of "The World Report on End User Computing" newsletter.

- Preserving local autonomy. Each group can make its own local decisions, within fairly broad guidelines that permit data exchange and communication.
- Preserving previous investments. You don't have to throw out what you bought before but rather create an ongoing coexistence plan.

Other side of the story

On the other hand, multivendor systems have some clear disadvantages that are often overlooked in the rush toward systems integration, because the positives can be so organizationally and politically attractive.

- Vendors often work the hardest on the products they can sell at premium prices under their own strategies. When you insist on integration across multiple vendors' products — and strategies — you often end up with lowest common-denominator computing.

To be fair, the vendor does not set out to say, "If you won't play ball properly, I'll keep the best for those who will." Exciting computing may just require more knowledge and control of the computing environment than can readily occur in today's mul-

tivendor integration schemes. It makes sense that each vendor will work out challenges and problems first in its own familiar environment and then only later — if at all — in multivendor environments that include its products.

- In the old days, when your IBM system broke, you called IBM. And when your DEC machine broke, you called DEC. Today, IBM, Compaq and IBM clones may be attached to several different networks — with different types of network servers in each work group — linked via local and remote networks to a variety of minicomputers and larger hosts.

With the advent of second-generation operating systems and widespread proliferation of Apple Macintoshes in the corporate setting, figuring out what broke is a major problem. Is it a workstation problem, a communication problem, a host problem? Is it hardware or software or both? Complex problems that involve the interaction of multiple vendors' products are the hardest problems of all.

- Problem resolution in a multivendor environment requires that someone act as the systems integrator. Until recently, for all but very large accounts — typically federal government agencies and a few very large commercial companies — a system integrator was, by default, the user organization and

its information systems department.

This arrangement seems about to change. In the last few weeks, both DEC and IBM have made statements, as part of their ongoing communication announcements, that the customer may choose to have either vendor service its own products along with specified products from other vendors.

Vendors have always done some systems integration and ongoing maintenance for a few — usually very large — customers. But few vendors have previously volunteered much information about such programs. They were often considered low- or no-profit situations that had to be accepted in order to keep a substantial customer relationship.

Today, providing multivendor systems integration looks like an excellent business opportunity. In this emerging market, a variety of companies, new and old, will try to make a big business opportunity.

The traditional systems integrator will continue to expand their interests by servicing commercial and government accounts and finding ways to profitably service smaller customers.

Competitive pressures will force all computer vendors to provide systems integration as a service. Properly handled, this work can be a real revenue con-

"I know how tough traffic can be around here, so let's just wait a few extra minutes before we start."

Despite Thursday's nonstop action and excitement, attrition knocked the class of 26 down to a class of 8. The Authority is a no-show, and the Asker now sits quietly in his seat. The Sleeper is here, too, but I think he just stayed over from the night before.

11:30 a.m.

"Let's take lunch now, but plan to be back promptly at 3:00 p.m."

Why do I have this feeling that the instructor is running out of material?

3:20 p.m.

"Well, if there are no further questions, please fill out your class evaluations and leave them up front. My manager really relies on your feedback for my appraisal."

I pause for a moment. Should I say what I really think? Should I tear the course apart? For some strange reason, the instructor is putting up an overhead of his pregnant wife and his six kids.

Maybe next time. Why fight the system?

I race through the forms. I grab my manuals and sprint for the exit. I am the last one out the door.

tributor. But vendors need to remember that when they're selling a service, buyers expect high standards in knowledge and performance.

For vendors that have isolated themselves from integrating competitive products, it could be some time before their field staff is fully prepared to provide knowledgeable integration, support and service.

New companies, built around the notion of providing systems integration as their major service, will enter the marketplace.

All of these providers, and the user organization as the systems integrator itself, will be greatly assisted in this process by the increasing acceptance and implementation of international standards for communications and data structures.

You can't have it all

No vendor is going to agree to support and integrate all the other products in the marketplace. Each vendor will selectively support those products it sees as being allies; those that are required to be competitive and those that important customers demand.

Today, users can expect and demand much more support and cooperation in designing, implementing, maintaining and enhancing systems. The old days of the one-vendor system are probably gone forever, and few of us would wish them back.

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SYSTEMS & SOFTWARE

HARD TALK

Jan S. Bozman

Doing the old end run



In the old days, when IBM mainframes couldn't talk to Honeywell mainframes or NCR mainframes,

there was always the old end run to data compatibility. You simply grabbed a reel of data tape off one computer, walked it down the hall and placed it onto the second computer's tape drive.

But those were the old days, right? Today, we have an alphabet soup of compatibility facilities, including Manufacturing Automation Protocol, Technical Office Protocol and Open Systems Interconnect, that make computers talk to each other. Right?

Not exactly. The economics of long-distance communications over leased lines still make it cheaper for many organizations to express-mail data tapes to each other overnight. And some MIS shops still subscribe to the philosophy of "Sovakernet"—namely, that it is still cheaper to get some kid to walk a data tape down the hall or even to hike it across town. With this in mind, I was pleased to note two September news announcements that prove the old data-tape end run is still alive and well.

First, Memorex Telex in Tulsa, Okla., announced an IBM 3480-compatible tape cartridge drive that can be attached to IBM System/38 and Application System/400 machines. The Memorex 5461 tape subsystem

Continued on page 34

Awaiting more VM/XA function

Users say IBM reacted to input, designed second release to please critics

BY STANLEY GIBSON
CW STAFF

A first taste of IBM XA computing has left VM users with a taste for more and the hope that future releases will go down a bit smoother.

While VM/XA System Product 1 has opened new horizons for users, its problems have prevented it from being generally released. And it apparently will not attain that status before being superseded by VM/XA SP 2, which IBM is indicating to users will ship on time in December.

An IBM spokeswoman said last week the operating system continues to ship in phases, and it has not been determined when it will become generally available. IBM still plans to make Release 2 generally available by year's end, she added.

"IBM has said VM/XA SP 2 is

on track and has not been affected," said Gabe Goldberg of IBM's VM Systems Group. Problems with the CMS component of VM/XA SP 1 have caused IBM to withhold the release to users with "CMS-intensive" requirements (CW, Aug. 1).

The CMS component would provide the interactive environment to support large numbers of users. "That worked with 100 to 200 users under VM did not work with 1,000 to 2,000 users," Goldberg said.

VM/XA SP 1 was announced in June 1987 with a scheduled general availability date of March 1988. IBM missed that deadline and began shipping the operating system to selected customers at the end of April.

Although it failed to deliver a high-end interactive operating system when it said it would, IBM was praised by Goldberg

and others for protecting users from a bug-ridden release.

"It was good that they did that, because users would have had problems," said Peter Kronenberg, a VM systems programmer at Information Builders, Inc. in New York. Information Builders is using VM/XA SP 1 on an IBM 4381 Model 14, primarily for development. Similarly, VM Systems Group is not a CMS-intensive user but runs VM/XA SP 1 on an IBM 4281 used mainly for development work.

Another user gripe has been the omission of ASCII support in the VM/XA SP 1. "It's a little mind-boggling that it slipped their minds," Goldberg said.

Romey White, vice-president of Velocity Software, Inc. in Boston, pointed out that IBM had offered ASCII support under VM since 1973 and that the

Continued on page 30

New game for service industry

BY ROSEMARY HAMILTON
CW STAFF

Service and maintenance providers today are faced with a choice: Come up with new and innovative services for users or say good-bye.

So claims the Lodgeway Group, Inc., a research firm based in Lexington, Mass. The company recently completed its third annual report on the service and maintenance market and claims that because traditional hardware maintenance sales are tapering off, providers are being forced to devise new offerings to bring in the bucks.

The Lodgeway Group said it expects that in five years this market will look completely different from how it does today. As hardware becomes more reliable, it requires less on-site care. As a result, by the early 1990s, the successful service providers will offer such services as software maintenance and consulting in areas like system design and network management, the research firm reported.

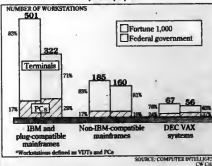
The companies will continue to offer hardware maintenance, the group reported, but it will become an increasingly

Continued on page 31

Data View

Civilian vs. federal workstations

Fortune 1,000 firms use more workstations* than the federal government does, and they use a smaller percentage of the PCs for that purpose



Librarian in VSE upgrade

BY AMY CORTISE
CW STAFF

Applied Data Research, Inc. (ADR) last week released a new version of Librarian that brings change control and management capabilities to its DOS/VSE customers.

The announcement comes less than two weeks after the Princeton, N.J.-based company announced it would be acquired by Computer Associates International, Inc. According to sources at ADR, however, the Librarian rollout was unaffected by the changes at ADR.

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Inside

- What installing an AS/400 looks like. Page 29.
- Unifors offers MSA financial solutions. Page 29.
- Mexican bank picks up Internet system. Page 29.
- Iverson offers tape-drive sharing. Page 35.

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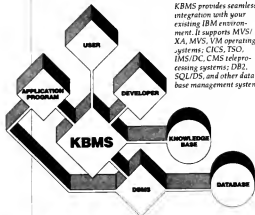
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A major computer company is saving over \$25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

These are true stories. Yet expert systems still have not taken a serious place in the business world.

Why? Because they've been available only on specialized systems using esoteric languages like LISP and PROLOG. So, like the companies described above, you could only benefit from knowledge-based systems if you had a great deal of money, people and time to make them work.

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AICorp, a developer of AI-based mainframe applications for more than 10 years, and the creator of the INTELLECT[™] natural language system, is holding a series of seminars that will show you how KBMS can provide a measurable, significant and immediate return on investment for your company.

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like the 4050, the 4075 and the 3700 for data centers and distributed locations; and the versatile low-volume 4045 for office and terminal-network environments. There's also the newly introduced 92 ppm 4090 for the ultimate in mid-volume productivity and the 4650 with 600 x 600 spi resolution. Team Xerox professionals have already converted thousands of data centers to electronic printing—Xerox Intelligent Printing Systems are compatible with virtually every mainframe—and as a result have specific applications

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SOFT
TALK

Mark Duncan

Time to
shift gears

Quality assurance functions in data processing present something of a conundrum. They may easily be the most important component of MIS departments, but they are also probably the most endangered species within MIS.

They are important because they are the manifestation of MIS management's commitment to producing quality application software. And they are endangered because they are only an "assistance" to system developers. This assistance can be heeded or ignored, depending on such influencing factors as project deadlines and the extent of management's endorsement of the need to enforce standards.

Over time, lack of acceptance of quality assurance renders it merely ornamental. For quality assurance functions suffering from this condition, it is time for action. Quality assurance must shift into a higher gear.

Thus, in addition to the traditional activities that quality assurance must undertake, there are a number of other considerations that deserve attention. They will enable quality assurance to not simply do its job but to do it effectively — possibly even to excel at it.

Keeping up

Quality assurance must do enough research and development to stay abreast of applications development in terms of tools and methodologies. It is not enough to adopt a reactive disposition and try to fit methodologies around tools that others acquire. Quality assurance must establish and aggressively promote a methodology that best fits the style of development and the environment and then recommend appropriate tools to automate that methodology.

Rubbing shoulders with staff from development centers and information centers will keep quality assurance cognizant of trends in automation and the direction in which the organization is heading. Anticipating change and planning for it with versatile methodologies will lessen the "methodology rewrite" lessons that quality assurance typically spends much of its time.

Computer-aided software engineering technology and the programmer workbench con-

Continued on page 34

The hectic transition to the AS/400

ON SITE

BY ROSEMARY HAMILTON
OF STAFF

September was a month unlike any Robert Irwin had had in a long time. As corporate MIS director of C&K Components, Inc. in Newton, Mass., he oversaw the company's switch from an IBM System/38 to a new IBM Application System/400.

Irwin said the migration to the new IBM minicomputer platform had his share of expected problems as well as a few snafus that, based on what IBM told him, were not supposed to happen. But the new system is an overall success, Irwin said.

"I'm excited because it's up and running," Irwin said. "The

minor setbacks — we knew we'd encounter them. It took some long hours, but it was worth it."

The AS/400 installation is the first step in an information systems plan at C&K. The company, which has five other divisions worldwide, plans to standardize on this platform and a single manufacturing resource planning (MRP) software by 1991.

But before that can happen, Irwin and his staff of 11 had to get through last month. For four weeks, the C&K MIS staff re-



Robert Irwin sees eye-to-eye with the AS/400

P. CHARLES LADOGGI

solved a series of glitches with peripherals, prepped the software, ran tests and reran tests. On Sept. 22, they unplugged the System/38, pushed it to the back of the computer room and went live with the AS/400 Model 50.

Irwin said there has not been a problem since.

C&K, which makes electro-mechanical switches used in computers and electronic devices, was one of the first customers to receive an AS/400 in late August. IBM, meeting its targeted shipment

date, shipped systems to approximately 250 customers in the U.S. by summer's end.

On Aug. 24, an AS/400 Model 50 with 16M bytes of main memory and 3.2G bytes of disk storage

Continued on page 33

Unisys touts
MSA toolsBY AMY CORTESE
OF STAFF

Unisys Corp. last week announced three financial software applications from Management Science America, Inc. (MSA) as part of an agreement with the Atlanta-based software house.

The additions round out Unisys' financial product offerings for Model 1100 and 2200 and Series A and B customers, the company said.

The financial offerings include a project tracking system and purchasing system for 1100 and 2200 systems and an accounts receivable package for A series customers. The products are the latest of MSA's financial solutions to be ported to Unisys platforms.

The financial applications sets from MSA available on IBM and other platforms are identical to those offered by Unisys, according to Patrick Trivedi, Unisys project manager for financial products.

With the addition of project tracking and purchasing, all the MSA financial, payroll, human resources and cash management applications are now available for the 1100 and 2200 systems.

With the announcement of accounts receivable for Series A systems, only the purchasing and project tracking are not yet available, according to the firm.

The long-standing agreement between MSA and Unisys was enhanced this spring, with Unisys increasing its marketing responsibilities.

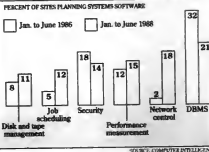
Unisys ports MSA products to Unisys environments and markets and supports the products to its customers. MSA provides the product code, documentation and education.

Under the agreement with

Data View

Network control on more shopping lists

Of almost 10,000 sites surveyed between January and June, 35% are planning systems software; among sites that are planning, buyer interests have shifted since similar interview two years ago

SOURCE: COMPUTER INTELLIGENCE
C.W. CHART

MSA, Unisys contracted for the right to market all MSA products. Prices range from \$72,000 to \$110,000 for accounts receiv-

able; from \$87,000 to \$132,000 for purchasing; and from \$28,000 to \$41,000 for project tracking.

SOFT NOTES

Internet hawks Atlas

Internet Systems Corp. in Chicago, a supplier of international wholesale banking systems, said it sold its Atlas system to Banco Nacional de Mexico's New York and London offices.

The \$2 million contract includes foreign exchange, money markets, funds transfer, commercial lending and accounting applications.

Internet also said it sold a global license for Atlas to the Royal Bank of Canada in Toronto. The bank intends to use Atlas in North America, Europe and the Far East.

XA Systems Corp. in Los Gatos, Calif., announced a marketing relationship with The Euro-

pean Software Company (TESC), headquartered in Dublin, Ireland, with offices throughout Europe. TESC, a subsidiary of Boole and Babbage, Inc., will sell XA's IBM mainframe software in all major European countries.

XA's mainframe software products reduce the time programmers spend working with the complexities of files and databases, according to the vendor.

The software works with IBM MVS and MVS/XA mainframe systems.

Multi Soft, Inc. in Lawrenceville, N.J., recently signed a \$3 million joint marketing agree-

ment with Management Science America, Inc. (MSA) in which MSA will use two Multi Soft products, Infront and Software Distribution Facility. MSA will use the products to enhance current MSA products and develop future MSA offerings. The agreement also allows MSA to sell the two products to MSA users and other products.

Sequoia Systems, Inc. said its Series 200 fault-tolerant multiprocessor has completed the Unix Standard Operating Environment (SOE) testing conducted by Bellcore. The analysis focused on Sequoia's proprietary operating system, Topix. Topix is fully compliant with AT&T's Unix System V.2 Interface Definition.

The SOE is intended to facilitate application generation by

and for the Bell operating companies. An SOE will support the development of generic non-hardware-dependent applications capable of running on all machines.

MSI Data Corp. in Costa Mesa, Calif., signed multiyear agreements with Supermarket, Inc. and Dotti Computer Systems, Inc. for their software products. MSI will port the retail application software of the two vendors to its Portable Data Terminals line.

MSI's objective is to offer an in-store system for the grocery, drug and hardware markets with an integrated database. The database will accommodate the growing need for direct store delivery and shelf price audit, according to Ralph Thomas, MSI senior director of marketing.

Librarian

FROM PAGE 25

"That will come with later releases," said Rich Parente, product manager for Librarian.

The release, called Librarian/Change Control Facility, includes a function for managing changes during the application development process when

used with ADR's on-line program development tool, Vollie.

There is a large measure of synergy between Librarian and many of CA's products, according to the companies. For instance, change-control software works hand in hand with security software. Although Librarian works with any outside security package, Parente said to expect closer ties to CA's security prod-

ucts in the near future.

ADR claims the new version is the first change-control product available for DOS/VSE. VSE customers contacted expressed enthusiasm about the product.

"There is just as much need for change control in VSE environments as there is with MVS," said Ross Maltman, a systems programmer at Misco, a Phoenix-based insurance company

and beta site for the product.

Maltman is already running Librarian in conjunction with CA's Dynam DT resource management software.

Maltman said he does not believe that the sale of ADR will have an impact on his operations, because he does not foresee CA cleaning house. "It would be a mistake for them to consider doing so," he said, adding that CA

is not familiar enough with the data set development market in which ADR operates.

Librarian Release 3.8, available now, also includes enhancements to all IBM 370 operating environments: ISPF/TSO, Roscoe, ISPF/CMS and VSE.

Current users can upgrade free of charge, according to ADR. For new users, the license fee is \$25,000.

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The new Kodak Optistar Autotouch finisher for the Komstar imaging system is productive proof of Kodak's continued commitment to the COM industry.

The Kodak Optistar Autotouch finisher lets you duplicate and collate fiche for optimum results with minimal operator intervention. And this new finisher's touch screen makes it uniquely easy to operate. Superb Kodak service and support, combined with advanced technology, assure high reliability and increased productivity. Compatible with current and future technologies, this important new product once again demonstrates Kodak's continued commitment to the COM industry. For more information, talk to your Kodak Business Imaging Systems representative about the Optistar Autotouch finisher, or call 1 800 445-6325, Ext. 303.



THE FINISHING TOUCH FOR COM, FROM KODAK

The new vision of COM



VM/XA

FROM PAGE 25

omission was probably more than an oversight. "IBM must feel there is an alternative in protocol converters," White said.

Nonetheless, some users say that IBM has listened to user complaints and offered signs that remedial action is being taken.

"IBM has said they recognize the requirement," Goldberg said. How soon ASCII support can be expected, however, is not clear, he added.

Object-code-only

A change in maintenance tools in VM/XA SP 1 has also stirred up the user community. Maintenance fixes are now shipped in object code.

"They don't ship you source updates, so you don't have the same control over what's in your system," White said. The object code replacements have made maintenance more complex, he said. With a mix of source-code patches and object-code updates, the likelihood of inconsistencies developing between modules is higher, White said.

"Aside from the object-code-only issue, I think the tools will be a great improvement," said Phil Smith, a product developer at VM Systems Group. He said the new tools have improved the method of distributing fixes, but their unfamiliarity, poor documentation and some "spectacular bugs" have been obstacles.

Regardless of how they are greeted by users, IBM has indicated the new tools will be part of VM/XA SP 2, Smith said.

In addition to more efficient CMS performance, VM/XA SP 2 will be welcomed for the VTAM support that IBM has promised with it.

Having experienced the deficiencies of VM/XA SP 1, customers are awaiting VM/XA SP 2 as a sort of panacea, most users indicated. And IBM's hints have left them with the distinct impression that help is on the way.

Nonetheless, it would not be fair to call VM/XA SP 1 a flop, Goldberg maintained.

"SP 1 gained users and IBM experience in working with bimodal CMS. It also enabled users to get migrations to XA under way," he said. "Given what a massive transition it is to go from 370 to XA, it was not a failure, but a first step."

Service

FROM PAGE 25

smaller chunk of their business.

The Ledgeway Group surveyed service suppliers and reported that the average company claims that hardware maintenance accounted for 81% of revenue in 1987. By 1992, they expect that percentage to drop to 61%, the research firm said.

The report also stated that total revenue in this market grew to \$51 billion in 1987, which shows an overall increase of 12.3% over 1986 revenue. However, when foreign currency

gains are factored out, the actual percentage increase is 6%, according to Richard Vancil, director of market development at the Ledgeway Group.

That 6% change marks the third consecutive year of slowing growth, Vancil added. In 1985, the service industry grew by 13%, and in 1986, the growth was measured at 8.7%.

The Ledgeway Group sug-

gests that computer companies, as opposed to independent service firms, will be better prepared to make this switch to new offerings because they have access to more corporate dollars than independents.

"As a group, we don't think [the independents] will handle the changes well," Vancil said. "They've structured themselves for a hardware-only oper-

ation, and they don't operate with the corporate resources of systems vendors."

As service providers depend less on hardware maintenance, the way they do business will also change, Vancil said. The traditional technician will become a less frequent sighting as service providers rely more on remote diagnostics and service.

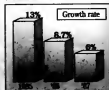
For such new areas as soft-

ware maintenance and network problems, remote services are more suited, Vancil noted.

The type of employee is also expected to change. The traditional technician will be replaced with consultant-like technicians who will have to be knowledgeable on hardware and software issues as well as networking, multivendor environments and overall system requirements.

The service industry's changing face

Real growth in hardware and software services and support continues to decline



SOURCE: THE LEDGEWAY GROUP AND CYCLOSTAT

HARD BITS

Sparc still on a roll

Sun Microsystems, Inc. is still on a roll with its Scalable Processor Architecture (Sparc). Sparc was recently selected by Prism, Inc., a Colorado Springs company that has a gallium arsenide project underway. The company said it intends to use Sparc in a supercomputer-class system with a gallium arsenide-based processor that has been scheduled for availability late next year.

The New Hampshire State Liquor Commission picked Nixdorf Computer Corp. to provide point-of-sale terminals and Unix-based minicomputers. The \$3.5 million deal will involve automating 75 New Hampshire state liquor stores. The stores require 230 terminals and will be supported by 77 of Nixdorf's Targon minicomputers.

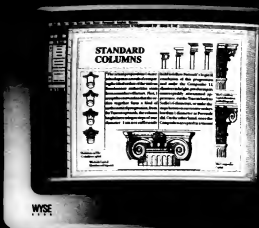
A Convex Computer Corp. minisupercomputer has been installed at the Michelin America Research & Development Corp. in Greenville, S. C. The company is the research arm of the tire organization.

Michelin said it will use the Convex system for three-dimensional finite element analysis to study new tire structures and designs.

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It should come as no surprise that the leader in displays is also the leader in software compatibility. As the standard, the WY-700 graphics subsystem now runs

over 100 programs in high resolution mode. Including Xerox Ventura Publisher and Aldus PageMaker/PC, plus many other DTP applications. And if you do more than desktop publishing, the WY-700 supports packages like Microsoft Windows and Excel, Lotus 1-2-3, and AutoCAD.

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Transition

FROM PAGE 29

age arrived at C&K's Newton plant. But other than arriving on schedule, the system did nothing more until the Labor Day weekend had passed. The problem: a faulty IBM 2440 tape drive, which had been announced along with the AS/400. The tape drive simply did not work, which halted the MIS team's implementation schedule.

According to Irwin, C&K had received a tape drive with a dead board inside. It waited two weeks for IBM to replace the defective 2440 component. There have been no other problems with the tape drive since the board was replaced, Irwin said.

In the first week of September, the two major jobs took place. On the systems side, Irwin's staff made sure that the processor and the various devices at C&K worked together. But not all of them did.

"We've had a few compatibil-

Although the installation is behind it, the MIS department was a hectic place late last month. Boxes and terminals were scattered outside the computer room. Walking through the computer room, built to accommodate a single minicomputer, was a challenge because the System/38 has not yet been moved out. Floor fans were set up and aimed right at the AS/400

because the air-conditioning system had been slowing down and MIS did not want to risk an outage.

Even though it will be cleaned up, chances are the department will still feel hectic for some time. Last month's installation was actually the first phase of a bigger project. MIS will be installing AS/400s or System/38s at the five other worldwide C&K

locations during the next three years.

A software selection team made up of end users was planning to pick an MRP II package Friday. The software will first be implemented at headquarters and then moved out to the other locations, according to Irwin.

By 1991, all divisions should be running the same software on the same hardware platform, Ir-

win said. This is a plan originally put into place in the early months of 1988. When it became clear that IBM would be announcing a System/38 follow-on in mid-1988, Irwin decided to move in IBM's direction. The company had been relying for years on an assortment of System/36 and 38 hardware, although none of the divisions ran the same software.

THE COMMON thinking is that you don't want to be the pioneer with the problems. But I didn't mind that."

ROBERT IRWIN
C&K COMPONENTS

ity problems with non-IBM devices, although we were told months ago that wouldn't be a problem," Irwin said.

One example was a protocol converter that ran on the System/38. It took data that was captured by factory devices such as bar code readers and translated it into System/38 code. It would not work with the AS/400 and required modifications that were completed before Irwin's group went on-line.

While the systems people tackled such problems, another group readied the software — some 1.5G bytes of data. C&K had used homegrown software on the System/38, which is planned to port to the System/38 mode on the new machine. Irwin said this group expected some glitches with the homegrown software, and they were right. But Irwin said the modifications required were minimal and the migration, for which they relied on the IBM tools, went smoothly.

Looking back at September, Irwin said he would do nothing differently. His one regret is that being an early user means there are few other users to rely on as resources.

"The common thinking is that you don't want to be the pioneer with the problems," Irwin said. "But I didn't mind that."



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COMPUTER ASSOCIATES

Bozman

CONTINUED FROM PAGE 25

tem records data on a standard 3480-compatible cartridge. That same cartridge can then be placed in an IBM 3480 cartridge drive, and the data is easily transferred to the IBM host mainframe.

"The 5461 cartridge is the same cartridge used with the IBM 3480 and Memorex Telex 5460 (drives)," a Memorex release said. "This allows the user with a mix of IBM 3090, IBM 4300 and mid-range systems to have the tape cartridge portable between all CPUs in the installation." The 5461, which costs \$42,509 for a single unit, replaces an older IBM 3430 or 3422 tape drive, Memorex said.

On the personal computer level, Irwin Magnetic Systems in Ann Arbor, Mich., announced that IBM had chosen to use its 80M-byte minicartridge tape backup drive in the IBM Personal System/2 line. Once recorded on the PS/2, the data on the Irwin minicartridge tape can then be "walked over" to an Apple Macintosh. It can also be used to transfer data to a Compaq computer or IBM Personal Computer AT that uses a 5¼-in. disk drive. That way, the minicartridge overcomes the incompatibility between the PS/2's 3¼-in. floppy disks and the PC AT's 5¼-in. floppy disks.

"Tape isn't just for backup anymore. It's for data handling," said Douglas White, vice-president of communications at Irwin Magnetics. "It's a very in-

teresting concept that people haven't really picked up on. Tape backup is thought to be an arcane art. A lot of people don't see the versatility of tape as a data transfer device."

But in companies in which Macintoshes and IBM PCs are cohabiting, the cartridge solution is a good one — particularly in cases where one type of computer is on the West Coast and the other is on the East Coast. Cartridges can be sent in the mail or by overnight carrier.

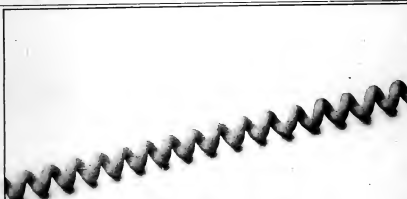
Even within a single office, the tape cartridge shuffle may prove an economical solution. The Irwin 80M-byte drives cost IBM PC owners \$849, White said, while Mac owners will have to ante up \$1,600.

What is the moral to the story? Well,

the computer industry has taken great strides toward compatibility during the last five years. State-of-the-art systems keep advancing in function and offering more power at lower prices. But the cost of wholesale conversion to the new systems is still high. Common sense tells us that people aren't going to "change out" all the mid-range System/386 or PC ATs they own. Most times, users would prefer a practical alternative to walking on "the bleeding edge." And, in the case of tape drives, that winning move could just be the old end run.

Speaking of which, happy football season.

Bozman is Computerworld's Chicago-based Midwest bureau chief.



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Duncan

CONTINUED FROM PAGE 29

cept are revolutionizing systems development. Quality assurance would do well to closely watch these emerging techniques and be prepared to relinquish its comforting grasp on the aging tools and techniques that have been adequate.

Of all the current buzzwords, "strategic" seems to be enjoying the greatest popularity. Pick up any computer magazine and "strategic advantage," "strategic mission" and "strategic this-that" will leap at you from the pages.

Within the organization, quality assurance must get involved in long-range planning. This will enable quality assurance projects to be initiated that correspond directly to departmental and corporate goals.

The advantage of tying quality assurance to strategic plans is this: Because benefits from quality assurance repeatedly manifest themselves only in the long term — typically 18 months to two years — synchronizing projects to long-range planning will tend to be supportive of quality assurance efforts.

Approval of quality assurance projects is rarely an easy task, which is probably why quality assurance staff are exemplary proponents of the "ask forgiveness, not permission" philosophy. Quality assurance staff must be prepared to "steal" time to experiment with new tools and methodologies. Often, this will allow collection of real evidence of quality improvement and cost savings to support proposals for future quality assurance projects.

Continuing education is a significant activity in quality assurance. Conference attendance, local quality assurance groups and peer organization information-sharing are all good sources of knowledge. However, self-teaching must generously supplement any budgeted training.

Quality assurance is relatively new to the data processing industry; as such, the tendency of the quality assurance staff is to indulge only in textbook practices or in what one picked up at the latest conference without truly determining the efficacy and value of one's actions. Realistically, quality assurance can only succeed when it focuses firmly on departmental and corporate goals and integrates itself into the strategy for achieving those goals.

Duncan is a quality assurance consultant at a major Dallas bank.

NEW PRODUCTS —
SYSTEMS

Data storage

A tape management system that allows the sharing of as many as four separate tape drives among two to four macro or minicomputers has been announced by Iverson, Inc.

Iverson Tape Manager (ITM) consists of an electronic digital switch that is reportedly transparent to the system software. Via the Pertec interface, the system offers support for Sun Microsystems, Inc., Digital Equipment Corp., Data General Corp. and IBM platforms. The ITM has 16 configurations.

The Iverson Tape Manager is priced at \$1,950.

Iverson, 1 Sanders Ave., San Anselmo, Calif. 94960. 415-459-5665.

Data General Corp. has announced a 5¼-in. 322M-byte Winchester disk drive for use with the company's Combined Storage Subsystem for Departmental Computers (CSS/DC) and the Combined Storage Subsystem (CSS) product families.

Designated the Model 6491, the new drive is said to increase maximum disk storage capacity for the mid-range and high-end DG MVS computer family by 37%. The product features an 18-msec average seek time and an 8.33-msec average rotational latency. The drive includes a one-year warranty.

The Model 6491 costs \$7,500.

Data General, 4400 Computer Drive, Westboro, Mass. 01580. 617-366-8911.

I/O devices

A 12 page/min. laser printer that was designed for use with IBM's System/36, 38 and Application System/400 minicomputers has



Acom's System/36 laser

been announced by Acom Computer, Inc.

The 5212E Postmaster laser printer includes an envelope feeder and is available with three paper cassettes capable of holding 250 pages each. It comes with an envelope bin that can

hold 100 envelopes. The product is said to have a 25,000 page/month duty cycle and is especially suited for word processing in a medium-size office environment.

The 5212E Postmaster costs \$6,945.

Acom, 2250 Obispo Ave., Long Beach, Calif. 90806. 213-498-3638.

A family of impact printers designed to address the high-speed printer marketplace has been announced by Storage Technology Corp.

The 5000E Series Printer Subsystem line consists of three models: the E21, the E28

and the E50. The single-hammer-bank E21 reportedly operates at a maximum print speed of 2,100 line/min. The heavier duty cycle, dual-hammer-bank E28 prints at 2.8K line/min., and the E50 offers operator-selectable speeds of 3K, 3.6K and 5K line/min.

All three units include a proprietary print-band technology that utilizes a photo-etching pro-

cess to ensure high-quality character definition and long band life, the vendor said.

The 5000E Series Printer Subsystems range in price from \$35,000 to \$74,000 depending on model. Existing 5000 Printer Subsystems are field-upgradable to a 5000E device for \$3,800.

Storage Technology, 2270 S. 88th St., Louisville, Colo. 80028. 303-673-5151.



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Keynote Address - Dr. Walter Culver, Corporate VP, Computer Sciences Corp.

Leading Edge Technologies - Ken McPherson, Director/Software Vendor Research, IDC; Ellen Staelin, Manager/Technology Futures Service, IDC

Corporate Networks - Mark Leary, Director/Communications Research, IDC

CIM - Scott Brady, Senior Consulting Manager, Arthur Andersen & Company

ADAPSO - George T. DeBakey, Executive Director, ADAPSO; Robert Laurence, President, Oracle Complex Systems Corp, Inc.

Government Trends - Dr. Thomas R. Davies, General Manager, Systems and Computer Technology

Contractual Issues - Theodore Ryan, President, Business Development Division, Electronic Data Systems

IBM Perspective - Gerald Ebker, VP & President, Systems Integration Division, IBM

Public & Private Sector User Panel

Day 2 — Tuesday

Concurrent Case Study Presentations:

Federal Government Panel - Peter Bracken, VP Federal Systems Integration, Martin Marietta Data Systems; M. Dendy Young, Chairman, Falcon Systems

Commercial Panel - Robert Henderson, Marketing Director, NCR Corp.; Ann Lazenby, Marketing Director, McDonnell Douglas; Judy Hamilton, Partner, Arthur Young & Co.

Investor's View - Stephen McClellan, VP Securities Research & Economics, Merrill Lynch

Human Resources Issues - Peter Sandiford, President & COO, SHL Systemhouse

Marketing Systems Integration - Karen Kugel, Director/Systems Integration Services, IDC

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NEW PRODUCTS —
SOFTWARE

System software

Software Pursuits, Inc. has announced a new option for its MVT/VSE operating system that reportedly permits IBM VSE users to address as many as 64M bytes of real memory.

The operating system runs on IBM 3090, 3080 and 4381 machines as well as most Amdahl Corp. and National Advanced Systems computers. It features a multiple address spaces function that allows as many as 16 16M-byte address spaces.

MVT/VSE is available on a monthly rental basis or with a two-year lease. Pricing starts at \$760 per month.

Software Pursuits, Suite 200, 1420 Harbor Bay Pkwy., Alameda, Calif. 94501. 415-769-4900.

A multiuser, multitasking operating system for real-time VME applications is available from Radstone Technology.

Microware OS-9 was designed for the Motorola, Inc. 68000 family of VMEbus processors and is available in versions for both professional development environments and read-only memory-based industrial systems.

The product employs modular programming techniques, and the system can be reconfigured by adding or subtracting modules without reverting to the source code, the vendor said.

Pricing for Microware OS-9 ranges from \$200 to \$900, depending on configuration.

Radstone Technology, 1 Blue Hill Plaza, Pearl River, N.Y. 10965. 800-368-2738.

Database management systems

Data General Corp. has announced DG/Ingres for its DG/SQL relational data base management system.

According to the vendor, DG/Ingres is a comprehensive application development environment that was developed in conjunction with Relational Technology, Inc.

The product reportedly offers decision support and application development tools integrated with DG's DG/SQL relational DBMS and CEO Office Automation. It will be marketed and supported exclusively by DG.

DG/Ingres is priced from \$1,260.

DG, 4400 Computer Drive, Westboro, Mass. 01580. 508-366-8911.

Information Builders, Inc. has announced the availability of an interface between Focus for Digital Equipment Corp. VAX

products and Britton Lee, Inc. Shared Database Systems.

Focus Interface reportedly allows all of the Focus software reporting, graphics, spreadsheet and data analysis facilities to directly access data stored on Brit-

ton Lee systems. According to the vendor, records are accessed directly using optimized SQL queries. Users may access Britton Lee databases simultaneously from both DEC VAX/VMS and IBM VM/CMS platforms.

The interface costs from \$420 to \$14,000.

Information Builders, 1250 Broadway, New York, N.Y. 10001. 212-736-4433.

Development tools

A menu-driven journal management and file recovery system has been introduced by On-Line Software International, Inc.

Filesave/RCS was designed to assist systems programmers, data administrators and other operations personnel in developing a complete recovery

system for managing both on-line and batch journals. It will also perform forward or backward recovery of partially corrupted files, the vendor said. The program runs in IBM's OS under MVS and MVS/XA.

Filesave/RCS' introductory price is \$12,500 per CPU.

On-Line Software, 2 Executive Drive, Fort Lee, N.J. 07024. 800-642-0177.

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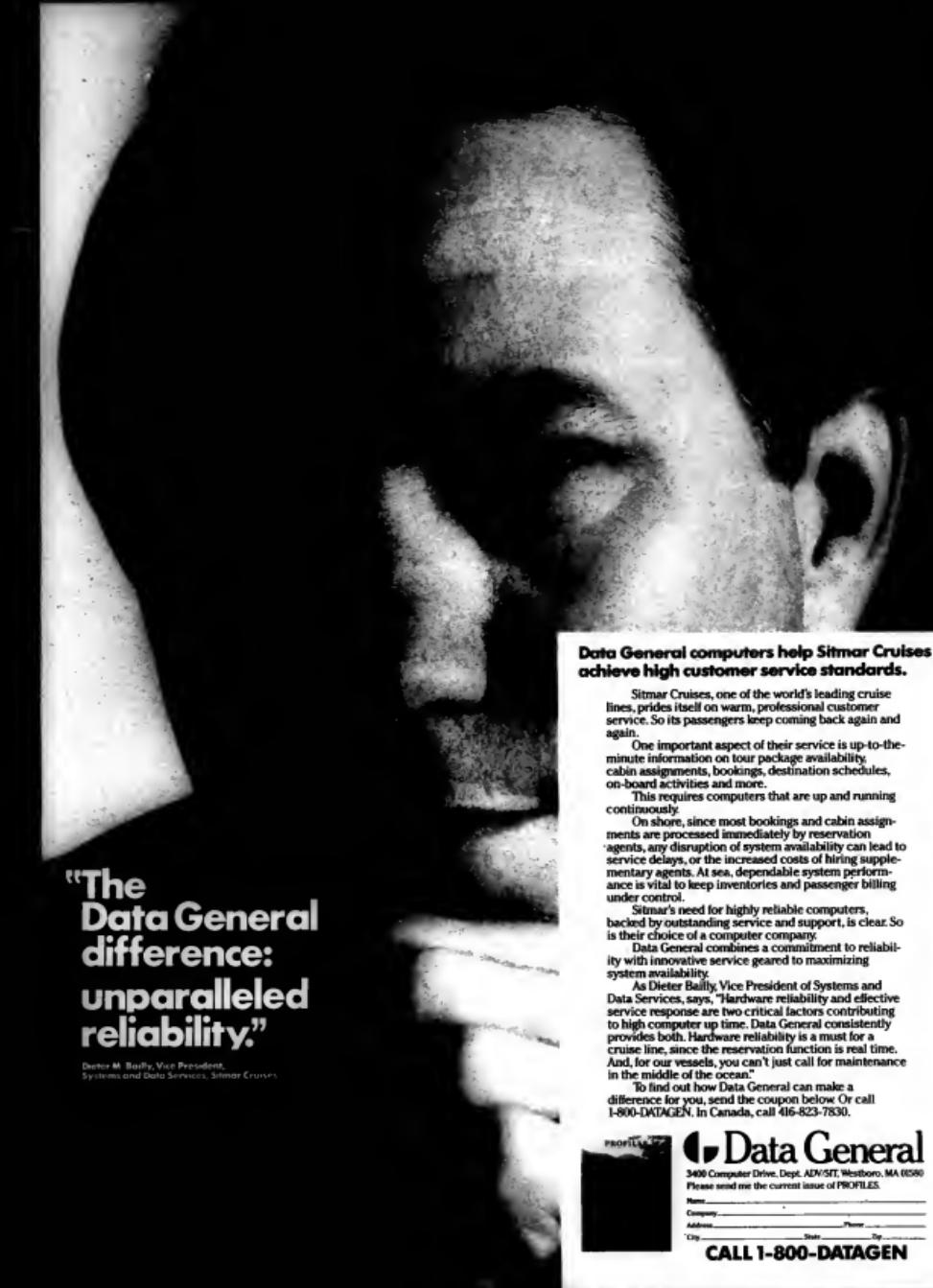
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Languages

Cobra Systems Software, developer of the mainframe Cobol generation product Cobra, has announced a new version of software that will run on IBM Personal Computers and compatible systems.

Called Cobra/PC, the product reportedly uses fourth-generation language-type free-form statements to create structured Cobol code. According to the vendor, the system will decrease programming time while providing easily maintained, standardized, structured Cobol. Programs may also be uploaded to the mainframe for compilation.

Cobra/PC requires a minimum of 384K bytes of memory and two disk drives for operation. Its license fee is \$495.

Cobra, Suite 1, 505 Acadia Drive, Petaluma, Calif. 94975. 707-763-5123.

Applications packages

A sales analysis software tool that allows users to develop sales reports has been added to the



Compusource's sales tool

Dynamic manufacturing resource planning (MRP II)-based manufacturing system from Compusource Corp.

Dynamic 4.21 is an MRP II-based production, inventory control and accounting system designed for all Data General Corp. computers running AOS or AOS/VS. It incorporates eight menu-driven screens that allow choice of information display or print-out by report, file, priority, sequence, selection criteria, time and other formats.

Dynamic 4.21 costs from \$9,000 to \$40,000, depending on hardware installation and total number of users.

Compusource, 21735 S. Western Ave., Torrance, Calif. 90501. 213-328-5150.

Harris Data Services, Inc. has announced Cobra, a system software package for IBM System/36 users.

Cobra is a health care and insurance package designed for businesses that have 20 or more employees and must comply with the federal Consolidated Omnibus Budget Reconciliation Act. Features reportedly include transactions such as qualifying events, coverage selections, changes in coverage and conversion elections.

The product also offers claims-tracking and a customized notice-and-letter-writing facility.

The Harris Data Cobra System costs \$3,000 and will interface with Harris Data Personnel and Payroll Systems.

Harris Data Services, Suite 200, 511 N. Barker Road, Milwaukee, Wis. 53186. 414-784-9099.

Utilities

Softool Corp. is now shipping Release 1.2.0.0 of its Change and Configuration Control (CCC) environment to Honeywell Bull, Inc. users.

CCC reportedly offers control over changes to individual components within versions of information as well as configuration

management capabilities.

CCC 1.2.0.0 running on the Honeywell Bull GCOS 8 system costs \$30,000.

Softool, 340 S. Kellogg Ave., Goleta, Calif. 93117. 805-683-5777.

Kisco Information Systems has enhanced F1 Manager, its disk management package developed for IBM's System/36.

According to the vendor, Level 3.0 can back up files, libraries and folders in either department or application groups. It can also specify retention periods for disk files and will provide for files to be saved off-line prior to expiration processing.

F1 Manager 3.0 costs \$250.

Kisco, Suite 4-J, 120 Beverly St., Mt. Kisco, N.Y. 10549. 914-241-7233.

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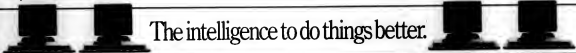
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 21. Communications Systems/Public Utilities
 22. Transportation
 23. Manufacturing/Processing/Marketing/Agriculture
 24. Manufacturer of Computers, Computer Peripherals
 25. Systems of Peripherals
 26. Computers & CP Services, including Software/Services
 27. Business Training/Consulting
 28. Computer Peripherals or Data Distribution/Rewriter
 29. User, Other
 30. Vendor, Other

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 11. President, Owner, VP
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 13. Dir. Mgt. Systems or Operations Planning
 14. Asst. Systems
 15. Dir. Mgt. Systems, Analyst of Systems
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 19. Data Comm. Network Systems Mgt.
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 15. Consulting Mgt.
 16. Systems Analyst
 17. Systems Engineer
 18. Systems Programmer
 19. Systems Analyst
 20. Systems Programmer
 21. Systems Analyst
 22. Systems Programmer
 23. Systems Analyst
 24. Systems Programmer
 25. Systems Analyst
 26. Systems Programmer
 27. Systems Analyst
 28. Systems Programmer
 29. Systems Analyst
 30. Systems Programmer

5. OTHER PROFESSIONALS

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11. Treasurer, Controller, Finance Officer
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13. Consulting Mgt.
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15. Systems Engineer
16. Systems Programmer
17. Systems Analyst
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27. Systems Analyst
28. Systems Programmer
29. Systems Analyst
30. Systems Programmer

6. COMPUTER INVOLVEMENT (Circle all that apply) Types of

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12. As a user, vendor or consultant
13. As a user, vendor or consultant
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Douglas Barney

Note from a slime-slinger



Are you a slime-wart? We recently got a letter from a gentleman with a unique perspective on IBM and its harmful effects on America. The argument was that IBM is too big, too monopolistic and thoroughly disruptive to the purity of capitalism.

IBM is also becoming too proprietary with the Micro Channel and too controlling by demanding royalties for alleged patent infringement on the Micro Channel and reduced instruction set computing.

The bottom line, according to the writer, is that anybody who buys a Personal System/2 is a slime-wart. He says that like it's a bad thing. Having become a slime-wart (that's journalism) many years before the PS/2 introduction, I, along with the three million slime-warts that bought PS/2s, am insulted.

Did they or didn't they? At the recent Extended Industry Standard Architecture (EISA) announcement, Phoenix Technologies officials boasted that the new bus was little more than the old PC AT, a 32-bit standard that Phoenix first proposed

Continued on page 54

Mac price hikes fishy, users say

Corporate customers question reasons, unevenness, timing of increases

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Corporate users of Apple Computer, Inc.'s Macintosh personal computer are speaking out against Apple's recent price increases and may alter their purchasing decisions as a result.

"We're not happy," said Angelo Micheletti, a technical service manager at Bechtel Group, Inc.'s AI Institute. "I don't think it's made many friends."

Like others, Micheletti questioned the reasons behind the hike. Apple blamed the increase on rising component costs and changing global market conditions and cited the scarcity of dy-

namic random-access memory chips.

An Apple spokeswoman said she expects demand for the Mac to remain strong.

However, Mac prices did not increase incrementally, users noted. For example, a standard Mac II with 1M byte of RAM increased by \$1,100 to \$4,869. An upgraded version with a 40M-byte hard disk and the same 1M byte of RAM as the standard model experienced only an \$800 hike to \$6,169.

Also, Apple raised Mac prices months after other PC vendors had made adjustments because of the DRAM crunch. In fact, many PC vendors have the memory-chip shortage is begin-

ning to ease. The dramatic increase in Mac prices might have been more palatable to users had it coincided with other pricing changes from other vendors.

"It's a tactical error," said Mike Bailey, a systems integrator at Lockheed Corp.'s Missiles & Space Systems. "Now that memory prices are going down, they raise the price on the Macintoshes. Something smells funny."

Some users said they will consider alternatives to the Mac.

Mary Howlett, manager of office automation at Hughes Aircraft Co.'s Ground Systems Group, said the increase will cause her group — the largest of

Continued on page 54

Utility finds files in library

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. announced a software utility aimed at helping microcomputer users who are tired of rummaging through endless application files in search of one tiny nugget of information.

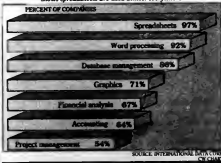
Turbosearch is an information retrieval program designed to quickly search through reams of data and fetch a piece of information located in a word processor, database or spreadsheet file.

Continued on page 49

Data View

Top PC tools in big firms

A tally of types of applications installed at 196 large companies shows spreadsheets are used almost everywhere



Samna does graphics now

BY MICHAEL ALEXANDER
CW STAFF

ATLANTA — There is a new graphics-based word processing package on the market from Samna Corp. that the company hopes will be perceived as being as friendly as its name.

Samna's Ami, French for "friend," is aimed at the casual user who wants the benefits of desktop publishing but not the headaches often associated with page-layout programs, according to Said Mohammadiou, the company's chairman and chief

executive officer. He stressed, however, that the program is a word processor, not a desktop publishing program.

"We define the market by the way people work, not by the contents of the document being published," he said during a recent product demonstration. "We're staying away from the desktop publishing market."

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Inside

- The whys and wherefores of PCs at Hughes Aircraft. Page 47.
- The last Word in processing. Page 47.
- Endline out with CPU platform. Page 55.

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SMALL
TALK

Mort Rosenthal

Who should
we listen to?

The recent introduction of several good text retrieval programs makes me think of one application that is really needed: a program to audit the predictions of industry analysts.

This package would be designed to retrieve every analyst's prediction for the last six months and check who was right and who was wrong, with predictions mattered and which ones did not. Industry pundits whose predictions did not jibe with reality would not be allowed to open their mouths for at least a month. OK, OK, make it a week. Admittedly, I do not know how the software package will enforce this last part.

Actually, industry analysts serve a very important purpose — to keep all of us honest by serving as watchdogs over the business. But what frustrates me is how disconnected they sometimes are from the reality of users and what they are really doing with personal computers.

One example comes to mind. The instant a product is announced, it becomes the main topic of discussion by analysts. The product's merits, though barely known, are immediately debated, its success and future are predicted, its sales curve is plotted — and its air-

Continued on page 52

Mac boosters abound at Hughes

Ground Systems manager aggressively promotes Apple PC as standard

BY JULIE PITTA
OF STAFF

Hughes Aircraft Co.'s Ground Systems Group, one of six operating groups that make up the giant military and defense contractor, has what are considered to be the most discriminating personal computer users within Hughes.

That group — Hughes' largest, with an estimated 12,000 employees — designs state-of-the-art air defense systems and naval electronic systems.

When Mary Howlett became manager of Ground Systems' office automation department two years ago, she found "blundering" users with no centralized PC purchase and support.

Her team jumped in, evaluated products, made purchasing recommendations and answered myriad questions from users — a rather imposing job, considering that group has more than

5,000 PCs.

Recently, Howlett talked with *Computerworld* West Coast correspondent Julie Pitta.

What is the procedure for purchasing new products?

It's a three-step process. First the user must fill out a requisition form justifying the purchase, stating the reason for the purchase and alternatives that have been reviewed. Then it goes up the chain of management within that division. Once approvals have been secured, it comes up to us for a final review.

What are your standards?

We have three. In the IBM world, we've stopped buying ATs for now; we've moved to Personal System/2s. With Hewlett-Packard, it's the Vectra line. With the Macintosh, they can buy the II or the SE.

How do you evaluate new**products at Hughes?**

We have good nondisclosure relationships with all three of our vendors so that we can get information early. Once it becomes available, we then bring it into our advanced products laboratory for evaluation. We also invite users from the division to come in and try them out. If everything is satisfactory, we add it to the list.

Why the Macintosh?

The Mac came to our company much the same way it came into others — through the back door. It appealed to users who were not computer-literate and didn't want to go to the trouble of learning a DOS machine. A lot of them were brought in for simple word processing or presentations graphics. There were so many of them being used within Hughes that we had to recognize it as a standard. We placed it on the list, but we didn't vigorously encourage its use.

Since then, Apple has done a lot of things in the communications area that have made us feel more comfortable. We're now aggressively pushing the Mac as a standard.

Has Apple been responsive to your needs?

Much more so recently than in the beginning. They've added staff to their national accounts team. They seem to recognize

that companies like Hughes need a dedicated staff. In the beginning, we didn't have a corporate purchasing agreement with Apple. We bought the Mac from local retailers. We won't do that if we can get a good price from vendors like IBM, Hewlett-Packard and Apple.

We also like to know a vendor's product plans in advance; we'd like to know we influence them. It's easier for us to plan for the future if we know what's coming.



Howlett watched the Mac come in Hughes' back door.

What has been the biggest challenge in integrating the Mac at Hughes?

The greatest challenge that we face with all the personal computers, in general, is getting the access to the data.

Our business runs off of mainframe data. Our users obtain reports off of mainframe data, and in order to get the particular extractions, they have to rekey it into a personal computer. Where the real benefit will be gained is through direct file transfer and easier manipulation of the data. We have to do that more often.

Continued on page 49

SOFT TIPS

Pitching patchware

You may have already found that there is a production error that exists on the first system disk of Ashton-Tate Corp.'s Chart-Master that causes the fourth choice on the Produce Chart menu to read exporting files instead of reading the Polaroid Palette program. Fortunately for the user, there is a patch disk available intended to correct

this problem.

To install the disk, the user must simply substitute the patch disk with System Disk One.

A warning: Be sure that you back up your charts before installing the patch disk.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

PC users remain true to their Word

BY STEPHEN JONES
OF STAFF

REDMOND, Wash. — Users of Microsoft Corp.'s Microsoft Word may flirt with the idea of moving to a jaxzed-up word processor from another vendor, but many have said they would rather stick with the tried and true capabilities of Word.

Users point to a variety of features, including advanced text editing and ease of use, that keep their faithful users of Word. But a less tangible factor seems to keep many users true to their Word and less willing to jump to such competing programs as Wordperfect Corp.'s Wordperfect.

Word is the word processor many users have grown up with, a reliable program that intro-

duced users to word processing when it was first released more than five years ago.

"I've experimented with other programs, but I have come back to Word every time — it covers everything we need," said Jeff Segal, vice-president of creative affairs at cartoon giant Hanna-Barbera Productions, Inc. in Los Angeles. Segal has been a Word devotee since the product originally shipped.

Microsoft has regularly enhanced the program, adding enough features to keep up with the competition and keep users happy. The latest upgrade is Word 4.0, which has been on the market for about one year at a cost of \$450.

Segal said the most notable enhancement to Word 4.0 is its increased flexibility, allowing users

to liberally modify the format of a document. All 40 function keystrokes included with Word 4.0 can be remapped by the user.

Segal and 25 story editors at Hanna-Barbera use Word to edit animation scripts that are formatted to meet the editors' particular needs. One function key modification was used to reflect the editors' own styles of outlining a script.

The user interface is also a winning point for Segal, who said Word 4.0's on-line tutorial and simple use of cursor keys are features that make the program easy to use.

"Even somebody who has had little experience on a computer can easily pick up Word and get going," Segal said.

Those kinds of features helped Word keep its status as

the word processor of choice at Hughes Aircraft Co. in Tucson, Ariz., despite a challenge from Wordperfect. Tim Davis, a senior project engineer at Hughes, said he was impressed with Word

haven't seen anything that Wordperfect has to offer that would cause me to make a wholesale switch."

Davis is disappointed when working in the program's graphics mode. While in that mode, users see a what-you-see-is-what-you-get (WYSIWYG) screen display of what a document will look like when printed. Word 4.0 boosted the speed of the graphics mode enough to make the WYSIWYG function useful for Davis. "There is finally enough speed so that the graphics mode is usable — now you can actually scroll through a document in graphics mode and not get frustrated by its slowness," Davis said.

Davis runs Word on both IBM Personal Computer ATs and Personal System/2 Model 60s.

But Word does not stack up to

Continued on page 49

Microsoft Word 4.0

Price \$450

- Requires IBM PC XT, AT, PS/2 or compatible.
- Maximum of 200K bytes with two floppy disk drives or one floppy and one hard disk.
- Permanent WYSIWYG graphics, spell-checker and style sheets.

4.0's combination of increased speed and graphics capabilities, along with its overall ease of use.

"It's powerful enough to meet our needs for a variety of users turning out a variety of documents," Davis said. "I



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MICROCOMPUTING

Help on the way for 1-2-3 users with drolled-up fonts from Funk

BY DOUGLAS BARNEY
OF TAPP

CAMBRIDGE, Mass. — For Lotus Development Corp. 1-2-3 users who feel left out of the spreadsheet publishing revolution spearheaded by Microsoft Corp.'s Excel, help is on the way.

Funk Software, Inc., which is renowned for its product that allows 1-2-3 users print large worksheets sideways, will soon let those same users print out worksheets drolled up with fonts, various type faces, shading and other new touches.

The \$149 Always allows for spiffed-up spreadsheets to be printed on a wide range of printers, from the choicest laser to the lowliest dot matrix, said Jim Kinlan, Funk's director of new product marketing.

"It makes the most of the printer you

have," Kinlan explained.

According to the vendor, the product is expected to bolster Lotus' defense against the graphical Excel, which created the minor but growing trend called spreadsheet publishing.

Do it yourself

Like desktop publishing, spreadsheet publishing simply jazes up output and at the same time reduces the need to rely on outside artists and typesetters to create

fancy documents.

To invoke Always, users hit a hot key and, with Lotus-style menus, go about altering the spreadsheet.

However, when in Always mode, users cannot enter data but rather have to hot-key back to 1-2-3 itself for any types of modifications.

According to the vendor, one drawback to the initial release is the inability to create a file usable by the vast majority of desktop publishing packages. For now, at least, users will have to be satisfied with spreadsheet-only output.

A later version will provide this capability, Kinlan promised.

The product is scheduled to be available early this month and works with 1-2-3 Release 2.0 and 2.01.

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True to Word

CONTINUED FROM PAGE 47

Wordperfect when it comes to importing graphics into the word processing program, Davis said.

With Word, a user has to create a graphic image in the Pageview mode using Microsoft's Windows environment. To add the graphic to the Word document, the file has to be imported into Pageview; the graphic is then placed in the document.

The task is much simpler with Word-

perfect, because a user can import a graphic in one step without going through the tedious steps of exiting the document and entering a Pageview-type environ-

THERE IS finally enough speed so that the graphics mode is usable — now you can actually scroll through a document in graphics mode and not get frustrated by its slowness."

TIM DAVIS
HUGHES AIRCRAFT

ment, Segal said.

Word has also had its problems while running with the Microsoft Mouse. Users have reported that the mouse goes wild when a combination of keystrokes are hit while using Word 4.0. The bug has since been cured by Microsoft.

Segal expressed dissatisfaction with some of the Word defaults, including the "clunky" file identification card that labels a document by name and length.

He also criticized Word's spell-checker program as being too large a dictionary to easily access and taking too long to load into the program.

Overall, however, users seem content to stay with the reliable Word and wait for minor problems to be cleaned up with future upgrades.

Floppies let ANSI down

Survey finds most 3½-in. disks just don't meet standards

Personal computer users experiencing data loss anxiety will receive little relief from current 3½-in. data storage cartridge offerings, according to a recent survey.

The market report, compiled after testing 25 brand-name products, found that most of the 3½-in. floppy disks on the market have failed to meet 100% of ANSI criteria.

The study, conducted by Memcon, an Omaha, Neb.-based floppy disk certification service, also reported that only three of the four brands that passed were reasonably priced.

TDK Corp.'s floppies received top billing for quality and price/performance at a cost of \$17.50 per box. IBM's floppies were a close second in quality but further back in price/performance at \$35.50 per box.

Bottom of the barrel

At the other end of the spectrum, SKC America, Inc. and Dyanon Corp. cartridge disks scored the lowest points in quality ratings. A box of 10 SKC floppies carries a price tag of \$14.80, while Dyanon's cost \$18.80.

The most significant of the floppy disk

testing criteria is data interchangeability, which is tested using ANSI's missing- and extra-bit standards, a Dyanon spokesman explained. Apparently, few of the brand-name floppy disk vendors take ANSI's criteria seriously, he said.

The PC market's 3½-in. data storage cartridge offerings are disappointing because the product technology is still in its early phase, according to the spokesman. "It is obvious that many of these manufacturers don't even intend to meet ANSI's criteria," he said.

Mac boosters

CONTINUED FROM PAGE 47

ciently to ensure the data is more accurate.

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They're being used in much the same places that IBM has been used: in financial analysis, manufacturing and engineering.

We're starting to use the Mac in engineering for CAD and CAM, using some commercially available packages.

What was your reaction to the two announcements made by PC vendors last week: the formation of the consortium group to extend the current AT bus and Apple's decision to raise prices?

I think [the consortium] was interesting. We'll want to get more information on that and see what IBM plans to do. I think Apple's decision to raise prices is unfortunate. It makes you wonder if now that they've got a lot of people using the Mac, Apple is trying to increase its revenue. I have news for them — they won't get away with it.

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Utility finds

CONTINUED FROM PAGE 45

The software can make its rapid-fire searches because of a library system that is used to arrange files according to subject.

The \$179 search utility is aimed at business users who deal with large amounts of data in areas such as financial services. With an eye on ease of use, Turbosearch features pull-down menus and a simple grid format that is used to enter search commands, avoiding the need to write complex search equations.

Vicarious innovation

The software utility announcement is characteristic of Ashton-Tate's drive to diversify its product line to include entries into every application segment. But some observers have said that many of the company's new products have not represented Ashton-Tate innovation because they were acquired from outside developers. Turbosearch is one of those products. The program was developed by Idan Software Industries Ltd.

The software was designed to work with files from Ashton-Tate applications, such as Dbase III Plus, but files from other DOS-based applications can be run with Turbosearch if they are converted to ASCII format.

User libraries can be searched by a specific word, file name or string of up to eight words that appear in conjunction with one another. Once the search is completed, a user can pick an item from a listing of all the files that contain the defined target of the search.

Turbosearch runs on IBM Personal Computers and compatible machines. It requires a minimum of 512K bytes of free memory and DOS 2.1 or higher. Ashton-Tate recommends a hard disk and one double-sided disk drive.



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Samna

CONTINUED FROM PAGE 45

Ami is the first in a generation of visually oriented, easy-to-use word processors, Mohammadian said. "It's the first word processor to define the whole process in a graphics-based environment in which text is still the primary element."

The program makes extensive use of the graphics features of Microsoft Corp.'s Windows and a mouse to speed the process of creating a document from entering text to editing on a what-you-see-is-what-you-get display, the company said.

Users can select from pull-down menus of command options and dialogue boxes to see the effect of each selection

before printing the document. Ami features a draft mode, a text-only display of a file and a default layout mode designed to show the file as it will be printed.

The program also features 25 style sheets — essentially, predefined page layouts of memos, business letters, newsletters, reports and other documents — that writers can use as is or modify. Ami also has such traditional word processing functions as search and replace, cut and paste, hyphenation and text justification and a 130,000-word spelling checker.

The program runs on an IBM Personal Computer AT or Personal System/2 and compatibles with Intel Corp. 80286 or 80386 microprocessors equipped with 640K bytes of random-access memory, Hercules Computer Technology, Inc.

graphics adaptor, IBM's Enhanced Graphics Adapter or higher resolution graphics adapter, IBM PC-DOS or Microsoft MS-DOS 3.0 or higher and a hard disk drive. A runtime version of Windows is supplied with Ami, but Samna recommends installing the full version of Windows 2.0 or higher.

The package is available through computer retailers at an introductory price of \$149 for the next 90 days after that, Ami will carry a suggested retail price of \$199.

Samna plans to introduce an advanced version of its new word processor called Ami Professional in the second quarter of next year. It will offer additional functions such as mail-merge, thesaurus and drawing capability, Mohammadian said. It will have a suggested retail price of \$495.

Rosenthal

CONTINUED FROM PAGE 47

vival or demise is decided. At this point, the analyst (or a member of the press) will call users and ask for a hypothetical prediction of demand for a hypothetical product or a product that has not yet shipped.

Now, I think that is pretty silly. By the time a product ships, all this speculation is old news, and it doesn't seem to matter anymore. Ironically, that is really when the users start to have a real understanding of the product and to care about it.

I usually get called two weeks after the first shipment of a product and am asked, "Is the product successful?" Well, it may have been in the news for a year at that point, but it is impossible to tell much about a product's success for several months. Corporations have to go through evaluation cycles and users need a few weeks to use the product before we know if it will be successful.

You have to remember that these analysts are not in business solely to convey the truth to the industry. They're trying to make a buck, too. As an analyst, you make a buck by either being controversial or by being the first person out with bad news.

On a more positive note, the pundit's real role is to provoke us to think about new technology today and in the future.

I find that the most useful analysts are the ones who cause us to think about emerging technology, who challenge our assumptions about an organization or about a product and inform us about events and conditions that we do not have access to. Also keep in mind that most analysts are not product reviewers. They might point out aspects of a product or technology that they find interesting, but for the most part they are working in a vacuum and talking about a typical user — or their conception of a typical user — as opposed to an actual user who is trying to find software that can do a job.

The outer limits

The analyst's favorite subject is technology, especially its outer limits. Then come products, and only after that come users and real applications. Rarely do analysts discuss such things as distribution channels, customer support and other elements that are extremely important to the success of a product and to the customer.

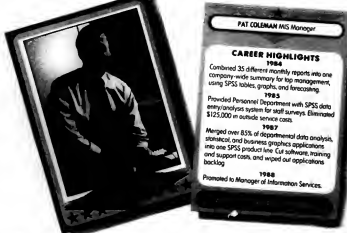
Users, on the other hand, typically are concerned with getting their jobs done, as distinct from knowing about a particular product and what is next about it. They are not terribly concerned about a particular technology and what its outer bounds are.

When I think of the role of analysts, I am reminded of such things as artificial intelligence, which continues to be the subject of an enormous amount of press. What we have seen is that AI has sort of snuck into products, such as Lotus Agenda. It has not been the great mass movement that the analysts predicted.

So when should we look to the analysts? Should we pay them heed at all? My advice is that you read what analysts have to say but remember that what you read is not always true.

Rosenthal is chairman and chief executive officer of Corporate Software, Inc., a value-added reseller of software and peripherals in Westwood, Mass.

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AT&T	Data Communications Systems	Gore & Associates	Metrocast
Augat	Data General	Government Computer	Metrolab
Avantek	Data Set Cable	News	Micom Systems
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Avdas Monitor	Datadisc	GTE Spacenet	Microtronix Systems
BBN Communications	Datadisc Technologies	Haley Systems	Micro-wave Networks
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required to return the Entry Form. Prizes will be awarded after you have received your full refund.

2. Mail Entry Form to: "See The Communications World" Contest, P.O. Box 101701-9171.

3. All entries received by November 1, 1988, will be eligible for the contest. Entries received after November 1, 1988, will be considered late. Odds of winning will be determined by the number of entries received. Entries received after November 1, 1988, will be considered late.

4. One (1) First Prize and one (1) Second Prize will be awarded. Winners will be notified by mail. Prizes will be awarded by random drawing. Prizes are non-transferable. Substitution is not allowed. Winner must consent to the use of their name for advertising purposes.

5. The contest is open to all individuals, regardless of age, sex, race, and religion. The contest is open to all individuals, regardless of age, sex, race, and religion. The contest is open to all individuals, regardless of age, sex, race, and religion.

6. For a list of winners, visit our website at <http://www.comnet.com>.

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Computerworld Extra on IBM
Issue Date: November 16 Ad Close: October 14

Despite growing challenges, IBM is still the industry leader. And after 1987 saw a year of promises from Big Blue, 1988 brought a year of reorganization in an effort to fulfill those promises.

On November 16, *Computerworld Extra*, a special publication from *Computerworld*, will take a close look at that reorganization. It will focus on the products and directions that Big Blue announced during the last 12 months—and reveal how users have reacted to them. It's an important story, and one you won't want to miss!

Computerworld Extra will look closely at IBM's reorganization with planned topics like:

- **IBM's new mainframe strategy.** Experts believe the company must reposition the mainframe as a database machine and network hub. We'll look at new and future mainframe technology from Big Blue.
- **A beefed up software front.** Two new software-only divisions should make IBM an even greater force in the applications market. Here's a look at the strategies and likelihood of success for these new segments.
- **The perils of reorganization.** We'll examine the effects of a radical restructuring—including the redeployment of thousands of employees from the factory to the field.
- **The new "team approach."** We'll look at the success of IBM's new Information Systems Investment Strategies (ISIS) in increasing user computer investments.

You'll also get your questions answered by IBM executives in our *Ask IBM* feature. Plus, you'll get a close-up look at Big Blue's new marketing leadership and much more.

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COMPUTERWORLD
Extra

An IDG Communications Publication



Barney

FROM PAGE 45

back in 1985. Unfortunately, Compaq and others rejected the notion, preferring to wait for IBM's next move, which turned out to be the Micro Channel.

But Compaq, which doesn't particularly like Phoenix, says that the read-only memory BIOS chip had almost nothing to do with EISA. That aside,

you've got to wonder how these competing personal computer vendors will cooperate and get EISA finished in the first place, given that the PC ET fell apart because of squabbling.

Compaq Vice-President Mike Swerely says a common goal will keep them together and that EISA learned a lesson from the immature handling of the PC ET proposal.

Still, it is a bit reminiscent of a man who gets divorced because he fought with his wife. After getting remarried, he pledges not to fight with his new wife. Go visit that guy and guess what you'll find him doing — fighting with his new wife!

Why an AT? Ever wonder why Lotus now recommends a "Lotus-certified" compatible PC with an Intel 80286 processor

or better to run 1-2-3 Release 3.0? I did, and now I think I know the answer.

Like the latest version of Microsoft's Windows, Release 3.0 apparently uses a special trick to free up some space by hiding 64K bytes of code. The thing is, for this to work, the PC has to have 1M byte of RAM divided into 512K-byte sets on the motherboard, which only the more recent IBM Personal Computer AT clones have.

It's going to cost them how much? Lotus' free Release 3.0 upgrade for current Release 2.01 customers does not come cheap — at least for Lotus. If you do the math, it costs Lotus a bundle. If we assume worldwide sales of 100,000 per month, with half of these users planning to upgrade, Lotus will miss out on \$7.5 million per month. If we simply look at the U.S. market in which, say, 60,000 are sold per month, Lotus still loses out on \$4.5 million. Don't feel too bad, though. Lotus is still creeping steadily toward the half-billion dollar mark.

No demotion around here. When Microsoft reorganized its applications group, some observers said that former head of

applications marketing Jeff Raikes was the loser. Instead of heading up marketing of all applications, Raiket got word processing and some nebulous office automation.

What these observers failed to see, points out a Microsoft marketer, is that Raikes actually gained responsibility. Instead of managing 60 people, Raikes now manages 140. And instead of just having marketing types reporting to him, Raikes has full control of programming, documentation, testing, etc. So instead of consolation, we offer congratulations.

We're confused. We're schizophrenic. We're Microsoft! No, Microsoft does not have a major personality disorder. It does, however, have a mixed view of Lotus' 1-2-3 Release 3.0, which will run under Microsoft's MS-DOS and OS/2.

A guy from Microsoft interested in the success of OS/2 told me to be nice to Lotus. "We need Release 3.0 to succeed for OS/2," he said. Then he also said nice things like "Release 3.0 is a great product."

But someone else from the applications side of Microsoft said curly, "We don't want Release 3.0 to do well." Jeepers. Wonder what Bill Gates thinks?

Becoming more cooperative: If you're sick of all this stuff about 1-2-3 Release 3.0, skip this item. If not, read on.

In all the hullabaloo over Release 3.0's three-dimensional spreadsheets, we've missed one important point that Lotus itself has failed to articulate. Because the Release 3.0 core will eventually run on everything from IBM 370s to Unix workstations to Macintoshes, it can underlie a new era of cooperative processing.

Forget all about that silly 640K-byte limit. Instead, we can use the PC as the front end and those butt-kicking IBM mainframes as spreadsheet engines for serious crunching. This is particularly handy for huge consolidated worksheets, but it also points out the need for improved auditing techniques. Just imagine some of the PC spreadsheet nightmares amplified on an IBM 3090.

Ouch!

Forget we need Release 3.0. And you know what they say: In a few million years, the sun will implode and completely burn out, which means that Lotus will have to finish Release 3.0 in the dark.

Barney is a Computerworld senior editor, microcomputing.

Price hike

FROM PAGE 45

the six that make up Hughes — to consider alternatives, notably IBM's Personal System/2. Of Ground Systems' 5,000 PCs, 60% to 70% are Macintoshes.

Apple is taking advantage of the Mac's growing popularity among corporations to boost revenue, Howlett said. "They won't get away with it," she said. "They have to remain competitive."

Tim Turnpugh, a vice-president at Seafirst Corp., a BankAmerica Corp. subsidiary, said the increase may cause fewer Mac purchases. "The more something costs, the less you can have of it," he said. "We have the same amount of dollars to work with; that's fixed."

Pest, Marwick, Mitchell & Co.'s partner in charge of audit technology, Dick Webb, said his firm is in the process of upgrading its current Macintoshes with more RAM. Some branch offices will likely wait to purchase memory upgrade kits until prices come down.

"The timing was the most disturbing thing about this," Webb said. "There was absolutely no inkling that it was coming. We couldn't plan ahead."

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NEW PRODUCTS

Systems

Redline Computers, Inc. has announced the Data Cell CPU platform. The product will transform most commercially available Intel Corp. 80286 and 80386-based microcomputers into a multiuser system server, network file server or engineering workstation, the vendor said.

The caster-wheeled tower unit features a built-in uninterruptible power supply, extra drive bays, data switches and a filtered power supply. The product is expandable to as much as 3G bytes of on-line disk storage and allows the physical separation of the CPU and disk drives. Dual four-way data switches share I/O data between eight peripheral devices.

The Data Cell is priced at approximately \$3,995, depending on configuration.

Redline Computers, 7924 Miramar Road, San Diego, Calif. 92126. 619-566-3883.

Advanced Logic Research, Inc. has unveiled two 25-MHz Intel Corp. 80386-based microcomputer systems.

Designated the ALR Flex-

cache 25836DT, the Model R66 and Model 100 have 66M and 100M bytes of fixed-disk storage, respectively. Both units feature a zero-wait state processor and a high-performance controller with full-track buffering and 1-to-1 interleaving, the vendor said. The machines also include a 101-key enhanced keyboard and one serial and one parallel port. Memory is expandable to 14M bytes with an optional expansion card.

The ALR Flexcache 25836DT Model R66 costs \$6,490. The Model 100 is priced at \$6,990.

Advanced Logic Research, 9401 Jeronimo Drive, Irvine, Calif. 92718. 714-581-6770.

Software applications packages

An integrated software package for MIS resource management has been introduced by P-Cube Corp. Called Opportunities+/IRM, the product reportedly will aid MIS professionals in planning, project definition, analysis, prioritization and performance evaluation.

The software is based on an

analytical model that measures the quality of information support in an organization: It includes a well-defined set of metrics, the anticipated contribution of proposed and existing projects. The system also measures the degree to which completed projects have fulfilled expectations. An IBM Personal Computer AT with a minimum of 512K bytes of memory is required for operation.

Opportunities+/IRM costs \$9,500, which includes training expenses.

P-Cube Corp., 915 Kings Canyon Rd., Brea, Calif. 92621. 714-990-3169.

Software utilities

Peter Norton Computing, Inc. has announced an upgrade of its DOS enhancement and file manager for IBM Personal Computers.

Norton Commander 2.0 is said to feature built-in Lotus Development Corp. 1-2-3 and Ashton-Tate Corp. Dbase viewers, which allows users to browse 1-2-3 and Dbase files directly from Commander. The product also offers a pull-down menu interface and requires DOS 2.0 or higher for operation.

The Norton Commander 2.0 costs \$89.

Peter Norton Computing, Suite 186, 2210 Wilshire Blvd., Santa Monica, Calif. 90403. 213-453-2361.

Macintosh products

360 Microsystems has introduced two software packages designed specifically for programmers of Apple Computer, Inc.'s IIGS microcomputer.

File Utilities I is a set of 14 commands that can be easily installed in the user's command shell, the vendor said.

The product incorporates APW/ORCA command standards and comes in a 3½-in. disk format. File Utilities I costs \$34.95, including a 30-page manual.

The 360 Text Tool Kit was developed to provide programmers with text screen-manipulation capabilities. The program consists of a set of library routines that eliminate the need for creating a sophisticated user interface. All functions can reportedly be linked to any language based on APW/ORCA.

The 360 Text Tool Kit costs \$49.95 and includes a 3½-in. disk and 200-page manual.

360 Microsystems, 12272 Fox Hound Lane, Orlando, Fla. 32826. 407-275-6418.

Peripherals

Perstor Systems, Inc. has announced three additions to its line of Perstor 200 Series Advanced Data Recording Technology controllers.

The PS180-16F, PS200-16F and PS180-16FHP are combination floppy- and hard-disk controllers for Intel Corp. 80286- and 80386-based microcomputers with speeds up to 25 MHz.

All are reportedly port-address- and register-set-compatible with the IBM Personal Computer AT controller.

Each unit is said to include a 16-bit bus, dual random-access memory, zero-wait state transfer and an on-board BIOS that supports a variety of hard disk tape drives.

The PS180-16FHP also includes a BIOS-resident cache that runs in any selectable combination of normal internal memory, Lotus/Intel/Microsoft Expanded Memory Specification or AT extended memory.

The PS180-16F costs \$345, the PS180-16FHP costs \$375, and the PS200-16F sells for \$365.

Perstor Systems, 7631 E. Greenway Road, Scottsdale, Ariz. 85260. 602-991-5451.

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North Africa...U.S. paratroopers on the way to their next mission. (Credit: International News Photos)

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"We've built a unique monitoring system that is PC-based and set up so that Monitor commands are automatically executed to identify poor response times. This lets me spend more time with features such as the storage display. Now when a problem arises in CICS, I can alter storage or delete ICE/AID dumps rather than shutting down and cold starting the system."

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NETWORKING

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Fred Barrett

Come on, get HLLAPI



More and more corporations are finding dumb terminal emulation on an unsatisfactory way to provide users' stand-alone personal computers with access to crucial mainframe resources. For one thing, it requires training users in mainframe operation.

One possible solution to this problem is the development of intelligent workstations. Two tools that IBM provides to do this are High-Level Language Application Program Interface (HLLAPI) and Advanced Program-to-Program Communications (APPC). Let's examine and compare them.

HLLAPI is a set of callable functions that emulate terminal user operations. Menu-driven programs can be written in high-level languages such as C and Pascal, which use HLLAPI functions to log on to mainframe systems, retrieve data and send data without user intervention.

HLLAPI is not a communications protocol but rather an interface to terminal emulation software. The advantage to corporate developers of an industry-standard interface is that one application can be created that will function across a diverse installed base of terminal emulation products.

HLLAPI applications can access any system or environment that an IBM 3270 terminal user can access without having to

Continued on page 62

Transmission spending sinking

BY ELISABETH HORWITT
ON STAFF

ELLCOTT CITY, Md. — Large firms will spend more on network management and data compression and less on data transmission equipment during the next two years, according to a recent report by Newton-Evans Research Co.

In a survey of 100 companies that either are in the Fortune 500 or have at least \$100 million in revenue, Newton-Evans found that the percentage of data communications budgets spent on data transmission will fall from 39% this year to 36% in 1990.

Conversely, respondents will spend roughly 41% of the budget on data compression equipment in 1990, compared with 40% this year, and 23% on network management systems in 1990, compared with 22% in 1988.

The respondents represented a mix of industry sectors: retail/

wholesale, public utilities, financial, manufacturing and transportation, the research firm said.

The results show that "American companies are maturing in their use of data communications and are moving to-

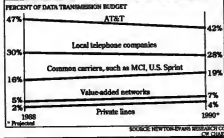
ward managing their networks more effectively," said the research company's president, Chuck Newton.

Many firms have already installed the basic transmission

Continued on page 62

Breakdown of data transmission budgets

AT&T, local telephone companies are losing to collocated competitors, based on preliminary results from a survey of 100 large companies.



IBM adds T1 net manager

First joint development products released

BY ELISABETH HORWITT
ON STAFF

NEW YORK — IBM has finally come out with a network management system for its resold line of Network Equipment Technologies, Inc. (NET) T1 switches, but it has not yet provided real integrated management of Systems Network Architecture (SNA) applications and T1 physical connections, industry sources said.

On the other hand, the graphics-based, mouse-driven, windowed workstation may be a harbinger of similar enhancements of IBM's own Netview network management system.

The first fruit of IBM's joint development agreement with NET, the Transmission Network Manager embodies NET's existing graphics-based workstation product on IBM's Personal System/2 running its OS/2 Extended Edition, IBM said. IBM has added a variety of features to the product, including an SQL-based database and bidirectional communication with Netview via Netview/PC, IBM spokesman Charles Shiverick said.

Stands alone

The system can act as a stand-alone network management workstation, collecting network

statistics as well as real-time alerts and alarms from NET Integrated Digital Network Exchange (IDNX) T1 switches and allowing the user to send reconfiguration commands to the network, IBM said. It also provides the same management capabilities via a Netview host, according to IBM spokesman Robert Anderson. The user can also program IDNX switches through the Netview-to-Netview/PC interface to initiate tests or reconfigure lines at a given time of day, Anderson said.

However, Transmission Network Manager does not provide the close integration between logical SNA applications and physical links that some users are demanding, according to David Passmore, a principal at Network Strategies, Inc. in Fairfax,

Continued on page 60

16M-bit Token-Ring delayed

BY PATRICIA KEEFE
ON STAFF

NEW YORK — Whether IBM's 16M bit/sec. Token-Ring?

Despite rampant industry speculation to the contrary, it was nowhere to be found among the 55-product avalanche unleashed by IBM at a press conference here two weeks ago. That is because it is still undergoing internal testing, according to Ellen Hancock, an IBM vice-president and general manager of IBM's Communications Products Division.

Specifically, IBM is working on connectivity issues in products that would attach to the 16M bit/sec. card, she explained. Industry analysts have said that the I/O ports on IBM's 9370, Application System/400 and some mainframes currently will only handle 4M bit/sec. data transmission.

Given that the 16M-bit Token-Ring was demonstrated as early as January and is said to be up and running at some IBM sites in Europe, there may be other reasons behind the absence of the reticent sibling of the current 4M-bit Token-Ring.

The most likely involves Test-

Inside

- More on IBM's connectivity announcements, page 60.
- Start-up plans fiber-optic net for Boston's tech region, page 61.
- DCA tool gives PC users access to mainframe graphics, page 63.

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IBM unleashes connectivity products

BY ELISABETH HORWITT
and PATRICIA KEEFE
OF STAFF

NEW YORK — While Netview enhancements and support of the Open Systems Interconnect (OSI) standard stood out among IBM's recent slew of connectivity introductions, the vendor also made key announcements in other connectivity areas and network management.

Among the many strategic IBM unveilings was Release 2 of Network Distribution Manager, which provides a mechanism for distributing software from a

central mainframe out to a variety of devices. The new release introduces IBM Personal Computer support, which should be a boon to companies such as insurance firms that "need to frequently update tables for thousands of agents" on PCs, IBM spokesman Robert Anderson said.

Release 2 also allows users to distribute microcode to 3174s. This method "sure beats mailing floppies" for companies that need to reconfigure 3174s at hundreds of remote sites, said David Pasmore, a principal at Network Strategies, Inc.

In addition to widening its OSI support, IBM introduced MVS support for Transmission Control Protocol/Internet Protocol (TCP/IP) in response to growing TCP/IP demand that has even leaked into the vendor's commercial accounts, according to Ellen Hancock, general manager of IBM's Communications Products Division. However, Gartner Group, Inc. analyst Steve Windler suggested that IBM covets the scientific, engineering and government markets, all of which are heavy users of TCP/IP.

"We are observing a general, subtle shift in the Fortune 1,000 to TCP/IP,"

WE ARE observing a general, subtle shift in the Fortune 1,000 to TCP/IP."

GEORGE COLONY
FORRESTER RESEARCH

said George Colony, president of Forrester Research, Inc. in Cambridge, Mass. He said many users have decided to go with TCP/IP for the next three or four years before shifting over to OSI.

IBM also announced support of Common Management Information Protocol, an application-to-application communications protocol that is slated for use by both OSI and TCP/IP network management systems. The vendor has yet to announce support for Simple Network Management Protocol (SNMP), the current TCP/IP network management protocol.

However, Frank Daubeck, president of Communications Network Architects, Inc. in Washington, D.C., predicted that IBM might rectify that oversight with an announcement this week at the Interop 88 TCP/IP trade show in Santa Clara, Calif. IBM already has SNMP running on the National Science Foundation's NSF Net, he added.

T1 net manager

CONTINUED FROM PAGE 59

Va. "There is still no awareness of SNA sessions or virtual routes," he added.

This capability is badly missed by companies such as Sears Communications Co., which wants its NET-based SNA network to be able to correlate alerts generated by IDNX with the SNA resources that are logically using those facilities, according to Gary Weiss, a vice-president at the Sears, Roebuck & Co. subsidiary. "In today's environment, if you lose a T1 link between two IDNXs, the SNA world doesn't know [what happened to] the 10 or 15 logical SNA links that are going over that physical link," Weiss said. While the announcement is "a step in the right direction," the partnership still has a way to go, he added.

Getting friendlier?

Transmission Network Manager currently uses a windowing interface based on an internal IBM product that is not offered commercially, Shiverick said. The graphics feature is provided by a third-party vendor under contract to IBM. However, Shiverick indicated, Transmission Network Manager, along with future IBM network management products, will incorporate Systems Application Architecture components whenever possible, he added.

Pricing for Transmission Network Manager is \$20,000 or more, depending on the number of T1 nodes supported. The product will be available exclusively from IBM, with a scheduled release date of June 1989.

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Token-Ring

FROM PAGE 59

as Instruments, Inc. and its efforts to redesign the current token-ring chip set. TI recently canceled a scheduled press tour to discuss plans to unveil a reduced chip set for the 4M-bit network this month. The new design requires fewer chips and will lead to lower costs for manufacturers and, thus, for users, a TI spokesman said.

But a source close to IBM questioned whether TI would come out with a new 4M-bit chip set if IBM was about to introduce a 16M-bit card. Moreover, this source cited reports that TI is working on a single chip set that will support 4M- and 16M-bit speeds and suggested IBM may have delayed the introduction of its adapter to take advantage of this dual-mode capability.

"If you think back to the introduction of the original Token-Ring, IBM announced that TI would make these chips available to competitors so they could develop compatible networks," the source said. "If IBM was about to come out with a 16M-bit card, would TI come out with a chip set that only ran at 4M bit/sec.?"

IBM's Hancock did briefly refer to a "different chip design to

accommodate the [increased] speed" as one reason for the delay.

"Our position is that we'll announce it later this year," Hancock said.

Some pundits predict an unveiling during the week prior to the next major trade show in 1988, Comdex/Fall. Also slated for November delivery is IBM's LAN Server software, announced at Comdex/Fall '87.

Once unveiled, IBM intends to market the 16M-bit network as a gateway product, Hancock said. Echoing comments from users [CW, Sept. 12], Hancock said the 4M-bit network "is pretty robust by itself." She characterized the 16M-bit version as more of a gateway product for moving huge volumes of data, citing scientific and engineering work loads as examples. "This is where [100M-bit Fiber Distributed Data Interface] is looked at, also," Hancock said.

She said that users are most likely to leapfrog directly from 16M bit/sec. to 100M bit/sec., and she expressed doubts that the market would see products supporting in-between speeds such as 50M or 60M bit/sec. "I think there will be a place for each one [4M, 16M and 100M bit/sec.] for quite some period of time," she added.

Start-up is third firm in fiber network fray

BY ELISABETH HORWITT
CW STAFF

BOSTON — A third company has announced plans to offer fiber-optic-based communications for greater Boston businesses. Teleport Boston Corp., a 1987 start-up, recently said it will build a 100-mile fiber-based network that will provide regional firms with local connections and links to interstate carriers and other parts of the world via a satellite link.

The company said it plans a fiber network that runs west from Boston out to the high-tech region of Route 128 and north to Burlington. The service will specialize in high-volume voice, data and video transmissions at rates of 1.5M and 45M bit/sec., the vendor said. Pricing will be 10% less than comparable services, according to Teleport Boston President Bradley Youngman.

The newest entry in Boston's bypass market will be going head-to-head with two other contestants: regional carrier New England Telephone Co. and an earlier start-up, Teleport Communications Boston (TCB). Teleport Boston said it plans to differentiate itself from the com-

petition by offering a teleport satellite facility west of Boston that will provide area businesses with voice, data, and video communications to sites around the world, Youngman said.

The company is talking with the Massachusetts Office of Investment and International Trade about using the teleport facility to stimulate trade between Massachusetts and India, Youngman said. For example, Indian hospitals could use the satellite link to transmit X-ray photos to Boston for diagnosis by local hospitals that have more sophisticated equipment.

Reactions

Teleport Boston's potential competitors have not been idle. Anticipating market demand for a higher capacity, lower cost, more reliable medium than copper cabling, New England Telephone began laying down fiber in the Boston area in 1986, according to company spokesman Mark Marchand. The Bell operating company's fiber-based facilities, which went into operation last spring, currently connect more than 130 buildings in downtown Boston, he said.

The company has 67,000 fi-

ber miles in place throughout the state, with a heavy concentration in the Route 128 area. "This sort of competition has become a fact of life in the telecommunications market, and we already have a network in place to compete vigorously with systems like these," Marchand said.

Teleport Boston's plan is "very ambitious in terms of mileage in a relatively short time," said Paul Chisolm, general manager of TCB. TCB's construction plans are currently limited to downtown Boston, although the company is considering a loop out to Route 128, Chisolm said. "We've already proven we can do [a fiber-based metropolitan-area network]," he added. TCB is a joint venture whose partners are Fidacity Communications, Inc. and Merrill Lynch Teleport Technologies, Inc., which constructed a similar network in New York.

TCB initially planned to begin network operations in Boston's financial district by the middle of this year, but now it hopes to initiate service in January, Chisolm said. Teleport Boston said it plans to start installation early in 1989 and initiate service by mid-year.

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Fast net bows from Ultra

BY PATRICIA KEEFE
ON STAFF

SAN JOSE, Calif. — A 1G bit/sec. network unveiled recently by Ultra Network Technologies, Inc. reportedly makes use of more than 50% of the available bandwidth of any high-speed host's I/O subsystem. In comparison, typical networks only use 12% to 15% of a host channel's capacity, the company said.

Ultra Network Systems (Ultraset) was designed to attack bottlenecks in high-performance

distributed computing environments. It achieves its results through a combination of fiber-optic cabling and customized chips that offload network protocol processing from host software, said Rex Cardinale, Ultra's vice-president of engineering.

Ultraset reportedly minimizes the impact of network overhead and protocol translation activities that can hog bandwidth, limit throughput and create bottlenecks, particularly on high-speed channel-based networks, Cardinale said.

For example, Ultra said that when connecting to Cray Research, Inc.'s 100M byte/sec. HSX channel, its Ultraset reportedly can pass data in excess of 50M byte/sec.

The network is said to support a range of systems, including those from Cray, Convex Computer Corp., Alliant Computer Systems Corp., Sun Microsystems, Inc. and Silicon Graphics, Inc. Ultra software includes support for both the International Standards Organization Open Systems Interconnect model up through the transport level and Transmission Control Protocol/Internet Protocol.

Gateways to popular networks such as Ethernet are provided. Ultraset's hub-oriented topology links to other hubs and to host computers. There are three hubs, each optimized for a specific performance range of hosts.

Connection costs for both hubs range from \$8,000 to \$75,000, depending on the host computer connection.

The Ultraset Cluster reportedly networks workstations and file servers at rates of at least 7M byte/sec. and provides effective throughput of at least 4M byte/sec. For four or eight workstations, this hub costs \$49,000 and \$79,000, respectively.

Transmission

FROM PAGE 59

equipment they need to support a data communications backbone and now face increasing traffic, be added. Thus they need compression devices to economize transmission lines and systems to manage and ensure reliability on growing networks.

The survey also found that during the next two years, AT&T and the local telephone companies will lose some of their share of corporate communications budgets to MCI Communications Corp., U.S. Sprint Communications Corp., value-added network vendors and private network equipment companies (see chart page 59).

This trend stems partly from a growing cost-consciousness that has firms shopping for bargains — often offered by AT&T's rivals, Newton said. Another factor is the increasing number of firms that plan to bypass local carriers with private lines, he said. At least 20% of the respondents said they are planning the local bypass capability.

Value-added network vendors will snag market share from firms that want to use packet-switching services to link remote sites with relatively low traffic back to a central site, Newton said. Helping this trend is the fact that integrating packet switching and IBM's Systems Network Architecture is "much more doable today," he added.

Barrett

FROM PAGE 59

modify a single line of mainframe code. The high-level languages in which these applications are developed make them simple to create and maintain.

HLLAPI will have potential application as long as there is mainframe software utilizing 3270 protocols. IBM has indicated that OS/2 Extended Edition will support a version of HLLAPI this year; many other vendors plan or have support.

APPC is also an application program interface (API). It is a standard set of verbs that allows two application programs to initiate, execute and terminate a transaction using IBM's peer-to-peer LU6.2 protocols.

IBM has designated APPC as the common communications protocol for its Systems Application Architecture, so it clearly will play a major part in the vendor's unfolding communications strategy.

APPC's strengths

One of APPC's fundamental strengths is that it does much of the work of error detection and correction, while HLLAPI leaves such work up to the application. Another advantage of APPC is that its verbs exist in micro, mini and mainframe environments, so the potential exists for application development across these heretofore-incompatible spheres.

One APPC drawback is that it requires extensive coding on the PC and the mainframe be-

cause each program is quite specific to its target application. The code that is created to implement APPC is much more sophisticated than the code required for HLLAPI applications. Third-party vendors are undecided about the approach to implementing APPC in local-area networks and current workstation configurations.

HLLAPI and APPC have common goals but quite separate uses. The goal is to create a workstation that links end users to mainframes without the need for extensive end-user training. HLLAPI lets you front-end existing 370/3270 application software without modifying the mainframe code.

APPC will not interface to your current IBM 370 applications. APPC applications will be

developed specifically for distributed processing without mainframe intervention. HLLAPI will be useful for extending the shelf life of existing code; APPC will allow the future development of very sophisticated workstation applications.

The next five years will be the age of the application program interfaces. Systems developers will have to learn graphic-interface APIs, OS/2 APIs and communications APIs to keep up. Sorting out these tools will be time-consuming and initially unpleasant, but the potential advantages of company-wide access to corporate systems are monumental.

Barrett is president of F. J. Barrett and Associates, a connectivity consultant and training firm in Irvine, Calif.

NEW PRODUCTS

Local-area networking hardware

Madge Networks, Inc. has begun shipping its Local Ring Hub to U.S. distributors, systems integrators and OEM customers.

The product is an access and expander unit that allows users to add personal computers to a token-ring network without recabling. The device does not require an external power source or battery and plugs into an existing token-ring wall outlet. According to the vendor, as many as three Local Ring Hubs can be daisy-chained together to add a total of 10 personal computers or terminals to a token-ring network socket.

The Local Ring Hub costs \$445.

Madge Networks, Roanoke, Va. 703-982-0638.

A network controller card for 12-, 16- and 20-MHz IBM Personal Computer AT-compatible microcomputers is available from The NTL Group.

The Desnet local-area network reportedly includes an 8-

MHz on-board processor and uses 32K bytes of semi-random-access memory. Other bus configurations include the S-100 bus (IEEE 696) and Intel Corp. Multibus (IEEE 796).

In addition to the controller board, the company has introduced TAP III, a network transceiver that incorporates troubleshooting circuitry and indicator lights to aid in network installation and repair. The transceiver reportedly provides a network length of more than 3,000 ft without repeaters.

The Desnet network controller card costs \$410. TAP III costs \$105 for a quantity of one.

The NTL Group, 3265 Kifer Road, Santa Clara, Calif. 95051. 408-739-2180.

Local-area networking software

Datanex, Inc. has announced communications software for the Digital Equipment Corp. VAX and PDP-11 machines and the IBM Application System/400 computers.

Hasp+ features automatic route-back capability, which allows files from the IBM end to be

directed to print queues, batch queues or specific users. Job submissions, file transfer and automatic routing can be extended to VAX nodes in a Decnet or Vax-cluster environment. The AS/400 system requires IBM standard communications subsystem hardware and the IBM Remote Job Entry facility communications software for the DEC link. The DEC system requires Hasp+ communications software and a standard DEC communications board.

Prices for Hasp+ on the Microvax start at \$3,500, and for VAX machines, prices start at \$5,500.

Datanex, P.O. Box 1728, Eugene, Ore. 97440. 503-687-2500.

Network management

RND, a subsidiary of RAD Data Communications, Inc., has recently introduced the Remote Ethernet Management Station, a dedicated control station designed to control and monitor a bridge or router network.

According to the vendor, the system will monitor serial links between bridges, observe a local-area network connected to a particular bridge and regulate

actual bridge performance. The product is designed for use with RAD's Remote Ethernet Bridges.

Pricing for the Remote Ethernet Management Station starts at \$5,950.

RAD Data Communications, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

Network services

AT&T has begun to take orders for International Accunet Digital Services on undersea fiber-optic cable among the U.S., Belgium, the Federal Republic of Germany, the Netherlands and Switzerland, according to the company.

International Accunet Digital Services reportedly offers high-capacity digital transmission via the Atlantic Link of the World-wide Intelligent Network — the TAT-6 cable. The Services will provide private-line data transmission at speeds of 56K bit/sec., 64K bit/sec., 1.544M bit/sec. and 2.048M bit/sec. service is available only between the New York gateway and Europe.

Rates for the services will range from \$3,600 to \$9,500 per month. For higher volume customers, AT&T offers a pricing

plan with discounts of 5% to 15% on International Accunet Digital Services.

AT&T, 1200 Mt. Kemble Ave., Basking Ridge, N.J. 07920. 800-222-0400.

Links

Digital Communications Associates, Inc. (DCA) has announced a software product that will allow personal computer users to access graphics applications stored on a miniframe computer. The 3270 APA Graphics product is scheduled to be available this fall and will be priced at \$495.

DCA has also introduced the Irmix DFT. The software reportedly uses distribution function terminal technology to boost the communications processing power of personal computers that are linked to miniframe computers. The product will be available later this summer and will have an introductory price of \$295 for just the software. The introductory price of a complete system, including both hardware and software, will be \$995. Introductory pricing is effective through Jan. 31, 1989.

DCA, 1000 Alderman Drive, Alpharetta, Ga. 30201. 800-221-3678.

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DATAPPOINT

HARDWARE ROUNDUP

PCs, WORKSTATIONS AND SMALL SYSTEMS

Classic buses finish ahead in PC market

BY ALAN J. RYAN

Listening to IBM 18 months ago, you might have gotten the impression that personal computers in corporate America would soon be giving the way of the abacus, wide rule and adding machine. IBM was convinced that everyone would rush to follow the leader in the direction of its Personal System/2s, the Micro Channel Architecture (MCA) and OS/2 Extended Edition.

While some argue that the migration toward MCA is beginning, the market research numbers show that it is happening only at a glacial pace.

"At this point, the Micro Channel has been tolerated," says Michael Gould, director of corporate information solutions at CAP International, Inc. in Norwell, Mass. "People who would have bought IBM are buying IBM, but it is not clear that people have moved away from other brands to buy IBM."

"Classic" AT-style bus-based PCs with Intel Corp.'s 80286 and 80386 microprocessors made by IBM competitors have continued to sell at a rapid-fire pace this year, causing IBM to lose ground.

What is more, IBM's own non-MCA PS/2s are among the most popular offerings in the industry giant's product lineup. And last month, IBM created quite a stir when it introduced a non-MCA machine based on the 80286 microprocessor, which analysts speculated was a move to counteract sagging sales.

In 1988, 80386-based personal computers will account for 16.7% of all PCs shipped in the U.S., projects Bruce Stephens, senior PC analyst at International



MIKE WIGGINS

al Data Corp. in Framingham, Mass. IBM's share of the 386 pie will be a little more than one-quarter; other vendors will gobble up the remaining 900,000 units shipped.

That's not all the bad

news for Big Blue. According to Stephens, 52% of PCs sold in the U.S. this year will be based on the 80286 microprocessor. IBM will account for one-fourth of those units, claiming a 3% small-

er share than last year.

Of the total U.S. shipments of IBM and compatibles, IBM will roll in at approximately 23.6% this year, Stephens says. While

that figure is quite respectable, it is still down from last year's share of 26.2%.

Next year may tell a different story.

Clare Fleig, director of research at International Technol-

ogy Group in Los Altos, Calif., says that while the PC architecture has been strong in 1988, "I do think you will see a stronger shift to the PS/2 in 1989."

La Jolla, Calif.-based Computer Intelligence is getting the same readings. The PS/2 family will account for more than two-thirds of all PCs purchased by the Fortune 1,000 during the next year, that firm predicts, with Compaq Computer Corp. following at a distant second and Apple Computer, Inc. coming in third with 5%.

Of the PS/2 models, the Computer Intelligence report found that the MCA-based Models 50 and 60 would account for the majority of the purchases during the next year.

But reaching those levels will take some stretching after this year's lackluster reception.

Early adopters

Even though users didn't rush out to buy the MCA this year, vendors spent a great deal of time trying to copy it. Late last year and earlier this year, chip makers and BIOS vendors announced that they would make MCA-compatible products for closer.

In October 1987, Western Digital Corp. announced tools that would allow OEMs to put IBM PS/2 compatibles on dealer shelves by the summer of 1988.

On the heels of that announcement, Phoenix Technologies Ltd. unveiled its line of read-only memory BIOS products in November that would provide compatibility with the BIOS used by IBM in the PS/2s. And in January, Chips and Technologies, Inc. announced chip sets compatible with the PS/2 Models 50, 60 and 80.

While all this was happening, Intel was busy working on its own MCA-compatible chip set.

After the chip sets and BIOS announcements came a flood of talk about compatibles. Vendors indicated that, given their success in copying the IBM PC, they would follow IBM and legally clone the proprietary MCA. So far, however, all the talk has not produced much follow-through. Most of the plans were put on hold after it became clear that

PERSONAL COMPUTERS

INSIDE

High-Speed Chase

Minisuper workstations are the new game in town, and everyone wants to play. Page 77.

The Go-Go Years are Gone

The small systems market is settling into a steady and standardized middle age. Page 85.

Ryan is a Computerworld senior writer.

Finish

FROM PRECEDING PAGE

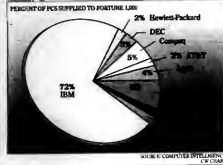
users were not lining up.

Tandy Corp. has been the only major player shipping a PS/2 clone using the Intel chip set. Its Tandy 5000MC is ready, but according to director of market planning Ed Juge, the demand is quite small.

Not even the mid-year announcement of more practical and speedier models in the PS/2 family caused much of a stir. While the fresh units made interesting improvements in the line, sales of the Model 70 have been slow, and sales of the Models 50 and 60 are expected to decline because of IBM's non-MCA 80386-based Model 30, announced in September, according to IDC's Stephens.

Cornering the market

Only one-fourth of all PCs supplied to Fortune 1,000 sites are non-IBM machines.



SOURCE: COMPUTER INTELLIGENCE, INC.

With most of the clone plans on hold for now, questions are arising surfacing about the viability of MCA. For some users, the decision of whether to buy into IBM's strategy was easy from the start. Many said they would prefer to wait until MCA became a standard and would continue to buy the classic-style vs. machines until then.

One significant announcement in that area came from Compaq, with its June introduction of the Deshpri 386 25-MHz machine, which "carries Compaq well into the upper reaches of the low end in terms of performance and price," CAP International's Gouldie claims.

Adding fuel to the fire, in September many of the PC-compatible vendors banded together to announce the Extended Industry Standard Architecture (EISA). The group said any clone maker will be allowed to license the 32-bit, extended AT-style EISA bus, giving users yet another alternative to MCA.

IBM itself has shown users that the AT-style bus is right for many users. In mid-July, it teamed up with Microsoft Corp. to introduce DOS 4.0, which provides users with some of the

benefits of OS/2, such as a menu-driven interface. When coupled with a windows-style application manager, DOS 4.0 will allow its users to perform some multitasking operations.

The upgraded operating system also incorporates the Lotus/Intel/Compaq Expanded Memory Specification 4.0, and it complies with IBM's Systems Application Architecture (SAA). It also has extended video and graphics capabilities.

Why choose?

One small company, Wells American Corp. in West Columbia, S.C., has found a way to capitalize on the current ambivalence in the market. In July, it unveiled CompuStar, which can be configured as either a Personal Computer AT or an MCA-compatible, or both, for users who

opt instead for the 386SX.

Compaq announced the Deshpri 386S in June, with prices ranging from \$3,799 to \$5,199. NEC announced its Powermate SX and Powermate Portable SX, priced at \$4,495 and \$6,595, respectively, in August.

The possible effects of 80386SX-based systems include "setting new entry price levels into 386 architecture, putting pressure on pricing for 286 systems and limiting the market for 8086-based systems," CAP International's Gouldie says.

The SX chip could bring about pricing competition on the 386 front, says John McCarthy, director of professional systems services at Forrester Research, Inc. in Cambridge, Mass. Because Intel is not cross-licensing the 386 microprocessor, prices on that product will not drop as quickly as they did on the 80286, 8088 and 8086, he says. The SX chip gives users a more cost-effective alternative and could hurt 80386 sales. That, in turn, could help to cut the 386 prices.

Drought spurs new crops

In previous years, the price tag on PC technology has dropped rapidly, and new products have been introduced at the same price points as products they were replacing. But this year's shortage of dynamic random-access memory (DRAM) chips has created a negative trend here.

In March, PC prices began to climb because of the chip drought. Some vendors, like Zenith Data Systems Corp., reduced the amount of memory in their machines to keep prices stable.

In May, the DRAM shortage indefinitely delayed the upgrade model of Apple's Macintosh SE, although the company introduced a 4M-byte configuration of the Macintosh II in August at Macworld Expo/Boston.

Forrester's McCarthy and other analysts say they believe the shortage will begin to ebb later this year. In the meantime, the DRAM drought, while affecting the amount of memory some vendors ship with their machines, has not slowed action noticeably on the development side. Some notable developments in the past year have come in the laptop and portable area, analysts say.

The new line of Zenith portables, announced in April, included the 80486-based Supersport, the Supersport 286 and Turboport 386. These, Gouldie says, "apparently were strong enough offerings that they froze a couple of other vendors in their paths," including IBM and Compaq.

Even if a laptop announcement by Zenith shocks Compaq, the company overall has been doing things right this year, by most accounts. According to IDC's Stephens, Compaq will ship approximately 575,000 units

The year in PCs

• **October 1987:** IBM promotes the Personal System/2 Model 60 with a price cut. Western Digital Corp. announces tools that would allow OEMs to put PS/2 compatibles on dealer shelves by the summer of 1988.

• **November:** Phoenix Technologies Ltd. unveils its line of read-only memory BIOS products that would provide compatibility with the BIOS used by IBM in the PS/2s. The Phoenix BIOS supports the Micro Channel Architecture (MCA).

• **December:** IBM begins delivery of OS/2.

• **January 1988:** Chips and Technologies, Inc. announces chip sets compatible with the PS/2 Models 50, 60 and 80.

• **February:** Kaypro becomes the first micro vendor to reveal definite plans to close the PS/2 MCA, saying it would ship the system by the end of May.

• **March:** Shortage of memory chips for personal computers starts to become a problem. PC prices start to rise. Apple Computer, Inc. files lawsuit against Microsoft Corp. and Hewlett-Packard Co., saying the companies violated Apple's copyrighted user interface. Tandy Corp. acquires Grid Systems Corp., a laptop computer maker.

• **April:** Microsoft counters Apple, charging slander and attempts to stifle development. IBM takes PC royalty rates for companies that license current and future IBM patents. Tandy and Dell Computer Corp. announce clones of the MCA. Apple pushes back release of its MCA clone until the third quarter, saying it is unsure which chip set it will use.

• **May:** Dynamic random-access memory shortage indefinitely delays upgraded model of the Apple Macintosh SE. IBM announces discontinuation of the 3270 PC.

• **June:** More models—the 502 and the 70 386—are added to the IBM PS/2 family. IBM unveils plan to let users trade in their PCs for PS/2s, but trade-in prices are too low for most users. Intel announces its 80386SX chip, a 32-bit microprocessor that uses a 16-bit external data bus. Compaq introduces its fastest 80386-based PC with the Deshpri 386S. Also announced is the Compaq Deshpri 386S, based on the 386SX chip.

• **July:** IBM and Microsoft announce DOS 4.0.

• **August:** Tandy bolsters PC line with new versions of 8088, 80286 and 80386-based microcomputers.

• **September:** IBM introduces PS/2 Model 30 286, an 80286-based machine using a bus similar to the PC AT bus. EISA group formed.

ALAN J. RYAN

1.5 million units shipped this year, about 775,000 will be the higher end Macintoshes, he says.

To try to bolster its presence in the corporate market, Apple has been increasing its connectivity and communications capabilities by acquiring two connectivity companies, Network Innovations Corp. and Orion Network Systems, Inc.

In addition, a strategic alliance with Digital Equipment Corp., announced early in the year, would allow the Macintosh to communicate with DEC computers, giving DEC the desktop workstation it needs and giving the Macintosh an easy road into DEC shops.

Both the Apple-DEC alliance and the chosen AT-bus consortium are likely to produce some action and dramatic tension in the coming year. Despite IBM's best efforts, none of these players is likely to go the way of the adding machine anytime soon. ■

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Expanded Memory	EMS/EMS 4.0 Included	Extra Cost	Extra Cost
Hard Disk Size/Speed	40 MB/28ms	30 MB/39ms	40 MB/28ms
DOS 3.3 and GW-BASIC®	Included	Extra Cost	Extra Cost
Easy 386 CPU Upgradability	Yes	No	No*

the market. In fact, among its many distinctions is the "Best of '87" award given by PC Magazine. But for those who can't stop thinking about the demands of the next generation of application software, the AST Premium/286 represents something different. Security.

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Personal computers

COMPANY	PRODUCT NAME	CPU (MICROPROCESSOR)	CLOCK SPEED (IN MHz)	OPERATING SYSTEM	INTERNAL MEMORY RANGE (MEGABYTES)	DISK STORAGE RANGE (MEGABYTES)	NUMBER OF EXPANSION SLOTS	NUMBER OF SERIAL PORTS	NUMBER OF PARALLEL PORTS	DESKTOP OR PORTABLE	FOOTPRINT (IN INCHES)	SUPPORTS OS/2	SYSTEM PRICE
Acer Technology (408) 323-6333	Acer 710	8088	16	MS-DOS	768K	20	Four	One	One	Desktop	14.2x18.2x5	Yes	\$1,075-\$1,385
	Acer 100	80286	13	MS-DOS	512K-56	40-76	Eight	Two	One	Desktop	17x18.4x4.5	Yes	\$2,890-\$3,495
	Acer 410	80286	16	MS-DOS	512K-18	20-40	Six	Two	One	Desktop	16.5x15.7x4.5	Yes	\$1,190-\$2,435
	Acer 415	80286	13	MS-DOS	512K-18	20-40	Four	One	One	Desktop	14.2x18.2x5	Yes	\$3,290-\$2,545
	Acer 1100	80286	16	MS-DOS	1-16	60-130	Eight	Two	One	Desktop	17x18.4x4.5	Yes	\$4,290-\$4,495
	Acer 1100SD	80286	30	MS-DOS	2-16	70-240	Eight	Two	One	Desktop	17x18.4x4.5	Yes	\$4,490-\$4,995
Alcatel Information Systems (202) 338-1400	System 3520	80286	30	OS/2, Windows, Multitask	3-16	100-160	Eight	Two	One	Desktop	6.3x18.4x2.8	Yes	\$7,890-\$11,090
	XT/AT Professional Series 380	8048	4.77-13	MS-DOS	768K-768K	720K-50	Four	Two	One	Desktop	14.1x15.7x4.1	No	\$1,250-\$2,375
	XT/AT Professional Series 450	80286	8-10	MS-DOS	3-8	1-44-72	Eight	One	One	Desktop	21.3x16.5x4.3	Yes	\$2,495-\$3,150
	XT/AT Professional Series 570	80386	16	MS-DOS, Xarus	3-38	20-40	Five	Two	One	Desktop	14.5x16.1x3.94	Yes	\$2,100-\$4,500
Amtek (609) 436-6870	XT/AT Professional Series 180	80386	6-16	MS-DOS, Xarus	3-38	1-44-160	Nine	One	One	Desktop	21.3x16.5x4.2	Yes	\$2,495-\$11,200
	Amtek System 280	80286	6	MS-DOS	\$12K-16	1-3-30	Seven	One	One	Desktop	13x18.4x4.2	Yes	\$1,590-\$2,390
	Amtek System 280A	80286	13.3	MS-DOS	3-16	1-3-40	Seven	Two	One	Desktop	13x18.4x4.2	Yes	\$2,495-\$3,090
	Amtek System 280	80286	6-16	MS-DOS	1-8	1-2-40	Six	Two	One	Desktop	13x18.4x4.2	Yes	\$1,890-\$4,950
AT&T (800) 347-1212	Amtek System 280B	80286	6-13	MS-DOS	1-8	1-3-40	Nine	Two	One	Desktop	13x18.4x4.2	Yes	\$4,290-\$4,390
	AT&T 6200 WGS	8048	10	MS-DOS	640K	20	Six	One	One	Desktop	21x18.4	No	\$1,411-\$2,490
	AT&T 6312 WGS	80386	12	MS-DOS, OS/2, Xarus	1284K	20-67	Six	One	One	Desktop	13x18.4x4.2	Yes	\$4,395-\$4,795
	AT&T 6386 WGS	80386	13	MS-DOS, OS/2, Xarus	1284K	20-67	Four	One	One	Desktop	13x18.4x4.2	Yes	\$4,290-\$4,795
AT&T 386 Work Group Series	AT&T 386 Work Group Series	80386	30	MS-DOS, Unix	3-40	1-85	Seven	One	One	Desktop	NP	Yes	NP
	Prostat/286 series	80386	16	OS/2, Xarus, Multitask, OS/2	512K-12	20-70	Seven	One	One	Desktop	18.2x16.5x4.25	Yes	\$1,195-\$4,195
	Prostat/286	80386	16	MS-DOS	112K-4	40-60	Two	Two	One	Desktop	18.0x14.8x3.4	Yes	\$1,890-\$3,795
	Prostat/286	80386	20	MS-DOS, OS/2, Unix	3-38	0-320	Seven	Two	One	Desktop	18.2x16.5x4.25	Yes	\$2,100-\$3,795
Canon U.S.A., Inc. (310) 448-0738	Canon 280 II Personal Computer	8086-2	4.77-6	MS-DOS	640K	300K	Two	One	One	Desktop	15.7x18.4x4.2	No	\$1,890
	Canon 4500/33 Personal Computer	80386	12	MS-DOS	0-38	64	Four	One	One	Desktop	14.1x19.1x4.75	Yes	\$3,390-\$4,420
	Canon 4500/33 Personal Computer	80386	16	MS-DOS	3-38	40	Eight	Two	One	Desktop	13x17x4.5	Yes	\$3,390-\$4,420
	Canon 4500/33 Personal Computer	80386	16	MS-DOS	3-38	40	Eight	Two	One	Desktop	13x17x4.5	Yes	\$3,390-\$4,420
Compaq Business Machines, Inc. (215) 379-0670	Amiga 500	68000	7.14	Amiga-DOS, MS-DOS	320K-6	80-unformatted	One	One	One	Desktop	17.7x15.5x12	Yes	\$795
	Amiga 2000	68000	7.14	Amiga-DOS, MS-DOS, Unix, C-64	1-6	80-unformatted	11	One	One	Desktop	17x16.5x12.5	Yes	\$2,195
	Amiga 2000 HD	68000	7.14	Amiga-DOS, MS-DOS, Unix, C-64	1-6	41-unformatted	11	One	One	Desktop	17x16.5x12.5	Yes	\$2,990
	Amiga 2500	68000	14.3	Amiga-DOS, MS-DOS, Unix, C-64	3-9	41-unformatted	11	One	One	Desktop	17x16.5x12.5	Yes	\$4,695
Compaq Computer Corp. (714) 379-0670	Desktop Model 2	8048	7.14	MS-DOS	256K-640K	20	Seven	One	One	Desktop	15.8x16.5x4.4	No	\$1,695
	Desktop 386 Model 1	80286	10	MS-DOS/Unix Version 2	640K-8.1	1.5-1.44	Seven	One	One	Desktop	18x16.5x4.4	Yes	\$2,695
	Desktop 386 Model 2	80286	12	MS-DOS	640K-8.1	1.5-1.44	Seven	One	One	Desktop	18x16.5x4.4	Yes	\$3,095
	Desktop 386 Model 40	80286	10	MS-DOS	640K-8.1	1.5-1.44	Seven	One	One	Desktop	18x16.5x4.4	Yes	\$4,190
	Desktop 386 Model 60	80286	16	MS-DOS	1-14	1.5-1.44	Six	One	One	Desktop	18x16.5x4.4	Yes	\$7,390
	Desktop 386/387 Model 40	80386	20	MS-DOS, OS/2	1-14	1.5-1.44	Six	One	One	Desktop	18x16.5x4.4	Yes	\$7,495
	Desktop 386/387 Model 120	80386	20	MS-DOS Version 3.0/OS/2	1-10	1.5-1.44	Five	One	One	Desktop	18x16.5x4.4	Yes	\$9,495
	Desktop 386 Model 1	80286	10	MS-DOS Version 3.0/OS/2	1-13	1.5-1.44	Four	One	One	Desktop	18x16.5x4.4	Yes	\$5,790
	Desktop 386 Model 2	80286	16	MS-DOS Version 3.0/OS/2	1-13	1.5-1.44	Four	One	One	Desktop	18x16.5x4.4	Yes	\$6,490
	Desktop 386 Model 40	80286	16	MS-DOS Version 3.0/OS/2	1-13	1.5-1.44	Four	One	One	Desktop	18x16.5x4.4	Yes	\$6,190
	Desktop 386/387 Model 110	80386	20	MS-DOS Version 3.0/OS/2	0-34	1.5-1.44	Six	One	One	Desktop	18x16.5x4.4	Yes	\$16,590
	Desktop 386/387 Model 300	80386	30	MS-DOS Version 3.0/OS/2	0-34	1.5-1.44	Six	One	One	Desktop	18x16.5x4.4	Yes	\$13,590
	Portable II Model 2	80286	6	MS-DOS Version 3.0/OS/2	256K-4.1	300K-1.44	Two	One	One	Portable	17.2x13.7x7.3	Yes	\$1,695
	Portable II Model 40	80286	8	MS-DOS Version 3.0/OS/2	640K-4.1	300K-1.44	Two	One	One	Portable	17.2x13.7x7.3	Yes	\$1,990
	Portable II Model 20	80286	12	MS-DOS Version 3.0/OS/2	640K-4.1	300K-1.44	Two	One	One	Portable	15x7.8x6.8	Yes	\$4,090
	Portable II Model 40	80286	12	MS-DOS Version 3.0/OS/2	640K-4.1	300K-1.44	Two	One	One	Portable	15x7.8x6.8	Yes	\$5,790
	Portable 386 Model 40	80386	20	MS-DOS Version 3.0/OS/2	1-16	1.5-1.44	Two	Two	Two	Portable	15x7.8x6.8	Yes	\$7,390
	Portable 386 Model 100	80386	20	MS-DOS Version 3.0/OS/2	1-16	1.5-1.44	Two	One	One	Portable	15x7.8x6.8	Yes	\$9,090

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

HARDWARE ROUNDUP

COMPANY	PRODUCT NAME	CPU (MICROPROCESSOR)	CLOCK SPEED (IN MHZ)	OPERATING SYSTEM	INTERNAL MEMORY RANGE (MEGABYTES)	DISK STORAGE RANGE (MEGABYTES)	NUMBER OF EXPANSION SLOTS	NUMBER OF SERIAL PORTS	NUMBER OF PARALLEL PORTS	DESKTOP OR PORTABLE	FOOTPRINT (IN INCHES)	SUPPORTS VGA/2	SYSTEM PRICE
Comal Business Systems (603) 435-0555	Comal Solution's Model 300	80486 max. 80486 processor	33	Cache, Dos	2-16	40-400	1 available	Two serial ports	One	Both	14.5x18x5.5	Yes	\$97
Compartech Technology, Inc. (408) 434-2543	CWS	30181	6	CTOS	1-4	None	None	One	None	Desktop	11.2x11.2x3.3	Yes	\$1,500
	NGEN Series 180	80180	6	CP/MS	1024-1	320	None	Two	One	Desktop	10.6x7.7x4.6	Yes	\$2,350-\$3,800
	Series 200 Processor CP-202	80210	6	CP/MS, DOS-2.0	1-4	40-2,300	None	Two	Two	Desktop	10.6x7.7x4.6	Yes	\$2,800-\$3,000,000+
	Series 300 Processor CP-302	80300	16	CP/MS, DOS-2.0	1-4	40-2,300	None	Two	One	Desktop	10.6x7.7x4.6	Yes	\$4,000-\$30,000+
	Network PC 300	20300	6	MS-DOS, Netware 1.0	1-1	40-40	Three	One	One	Desktop	10x10x3.5	Yes	\$2,500-\$4,900
	Network PC	80210	6	MS-DOS, Netware 1.0	1-1	40-40	Three	One	One	Desktop	10x10x3.5	Yes	\$1,475-\$2,400
Compaq, Inc. (617) 850-0801	CS60	80000-1	6	4.07, 4.08	640K	600K-20	Four	One	One	Desktop	14.5x18x5.5	Yes	\$400-\$1,200
	CS 4800	80000-1	16	MS-DOS	816-4	2-4	Eight	Two	One	Desktop	14.5x18x5.5	Yes	\$7,000
	CS 5000	80000-1	16	MS-DOS	1-2	40-40	Eight	Two	One	Desktop	14.5x18x5.5	Yes	\$8,000
	WPC Bridge (under model)	80000-1	6	4.17, 4.12	640	200-700K	Three	Two	One	Desktop	14.5x18x5.5	Yes	\$1,700
	WPC Bridge (under model)	80000-1	16	MS-DOS	640	200-700K	Three	Two	One	Desktop	14.5x18x5.5	Yes	\$1,700
	WPC Bridge	80000-1	6	4.17, 4.12	MS-DOS	615-700K	Three	Two	One	Desktop	14.5x18x5.5	Yes	\$1,000-\$2,000
	WPC Bridge	80000-1	16	MS-DOS	615-700K	Three	Two	One	One	Desktop	14.5x18x5.5	Yes	\$1,000-\$2,000
Case International Inc. (407) 997-6055	Amstrad 384	80180	3	DOS, Bank, Data, C/MS	615-4	40-700	Eight	One	One	Desktop	21x16x5.5	Yes	\$1,200-\$1,742
	Amstrad 384/20	80200	30	C/MS, Bank, Data, C/MS	1-10	40-700	Eight	One	One	Desktop	21x16x5.5	Yes	\$2,000-\$3,300
Case International Inc. (407) 997-6055	Case Computer/Case 384	80200-1	30	C/MS	615-4	700K-40	Four	Two	One	Portable	14.5x18x5.5	Yes	\$1,000-\$2,000
	Case Computer/Case 384	80200-1	30	MS-DOS	640K-2.5	30-30	Yes	Two	One	Desktop	17.7x14.5x3.3	Yes	\$3,000-\$4,300
	Case Computer/Case 384	80200-1	30	MS-DOS	640K-2.5	30-30	Yes	Two	One	Desktop	17.7x14.5x3.3	Yes	\$4,000-\$4,300
Deft Computer (313) 535-8340	DeftSystem 100	80000	9.64	MS-DOS	640K-6.6	20-20	Three	One	One	Desktop	3.25x11.75x1.75	Yes	\$1,000-\$1,999
	DeftSystem 200	80180	12.5	MS-DOS, DOS	640K-10	30-30	Six	Two	One	Desktop	6.6x11.7x1.7	Yes	\$2,000-\$4,999
	DeftSystem 220	80200	30	MS-DOS, DOS	9-16	40-100	Three	Two	One	Desktop	6.6x11.7	Yes	\$2,700-\$4,999
	DeftSystem 210	80180	30	MS-DOS, DOS	2-16	40-100	Eight	Two	One	Desktop	21.5x17.7x4.6	Yes	\$4,000-\$5,999
	DeftSystem 210	80180	30	MS-DOS, DOS	2-16	40-100	Eight	Two	One	Desktop	21.5x17.7x4.6	Yes	\$7,100-\$11,499
	DeftSystem 210	80180	30	MS-DOS, DOS	2-16	40-100	Eight	Two	One	Desktop	21.5x17.7x4.6	Yes	\$1,000
Digital Equipment Corp. (617) 552-0500	Series Personal Computer	80000	9	MS-DOS-1.3	30-30	30-30	Six	Two	None	Desktop	11.75x10.75x1.5	Yes	\$1,000-\$1,000
	Series 3	80000	4.77, 16	MS-DOS	640K-15.5	20	Five	One	One	Desktop	14.5x18x5.5	Yes	\$1,000-\$1,000
	Series 3+	80000	4.12	MS-DOS	640K-15.5	40-70	Six	One	One	Desktop	14.5x18x5.5	Yes	\$1,000-\$1,000
	Series 3+	80000	4.12	MS-DOS	640K-15.5	40-70	Six	One	One	Desktop	14.5x18x		

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Please see separate page.

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Minisupers are the new kids in town

BY NELL MARGOLIS and JULIE PITTA

A riveting battle of East and West start-ups enlivened the workstation territory this year as Sunnyvale, Calif.-based Ardent Computer Corp. and Newton, Mass.-based Stellar Computer, Inc. attempted to blast out a fresh market niche. In March, both companies wedded super-speed computing to high-voltage graphics to produce what has come to be known as the minisuper workstation.

What made the competition particularly interesting was the fact that the companies, both venture capital-backed start-ups headed by seasoned computer entrepreneurs, took different technological paths to strikingly similar ends.

Ardent's four-model Titan line is built largely on third-party technology: a MIPS Computer Systems, Inc. reduced instruction set computing (RISC) processor, used in combination with a custom-made vector processor, and a Silicon Graphics, Inc. board set. Titan's might is gauged at 40 million instructions per second (MIPS) integer and 64 million floating-point operations per second (MFLOPS) peak, according to Ardent.

Stellar's GS1000, designed in-house, harnesses 45 application-specific integrated-circuit CMOS microprocessors to yield 25 MIPS integer and 40 MFLOPS double-precision, according to Stellar. Industry watchers say the two systems look similar.

Both the Titan and the GS1000 are priced at less than \$100,000—less than half the price users would have to pay for minisupers offering comparable computing power.

And they're not alone. Apollo Computer, Inc. has already put one foot into the new market niche with its Domain 10000/Prism Architecture announcement. By year's end, analysts expect entries by Sun Microsystems, Inc. and Silicon Graphics, Inc. as well.

Silicon Graphics defended its niche, the market for three-dimensional graphics workstations, as other vendors eyed the arena. Silicon Graphics added a high-end workstation—expected to compete with the Ardent and Stellar class of machines—and hinted that it would introduce a \$15,000 3-D graphics workstation before the end of the year. A low-end system would give Silicon Graphics a complete range of 3-D graphics workstations.

For a niche that didn't exist at this time last year, the minisuper corner is getting crowded fast.

It's there, but...

"The market for these machines really is out there," says John Logan, executive vice-president of the Aberdeen Group, a Boston-based market research firm. The question is, how big is it? Vicki Brown, director of systems research at Framingham, Mass.-based International Data Corp., says, "We never expect [the minisuper workstation niche] to exceed 5% of the total market. The number of users who can pay the price for the power are limited."

High-end users such as scientists, en-

gineers and researchers who need—but formerly couldn't afford—super or minisupercomputer power currently make up the bulk of the minisuper workstation customer base. While the workstation vendors all talk about extending into commercial applications—finance and architecture, for instance—most analysts believe that it will be a long time before the minisuper workstation moves beyond technical markets.

WORKSTATIONS

On the other hand, as IDC's Brown points out, while the number of potential sales is limited, each sale is a big-ticket item. A successful minisuper workstation offering, she says, will be a good profit-maker for its manufacturer.

"We're going to see about 18 months of Ardent and Stellar pumping these machines into the pipeline," Logan says. "What comes after 18 months? That's hard to say. But in the meantime, the win-

ner is going to be the end user."

Apollo seemed ready to emerge from the shadow of archival Sun Microsystems, Inc. Then, the Chelmsford, Mass.-based firm, generally credited with creating the workstation market, crashed into a wall of corporate woes that riveted Wall Street and left industry analysts divided in their opinions about the company's future.

The early March announcement of the Domain 10000, the 60-MIPS flagship of Apollo's parallel reduced instruction set multigraphics (PRISM) architecture, was hailed as a technological milestone.

It was also a marketing coup—a far less frequent occurrence at Apollo, analysts agree—giving Apollo the first entry (if only by hours) in the emerging



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Margolis is a Computerworld senior writer. Pitta is Computerworld's West Coast senior correspondent.

minisuper workstation niche.

The next month, Apollo slashed the prices on its Series 4000 "personal super workstation" in order to be able to offer a 4-MIPS machine at prices starting below \$9,000.

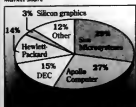
In June, the company topped the Series 4000 line with a 2-D graphics model and claimed processing speed increases of as much as 300% across the entire series, courtesy of a floating-point accelerator based on the Witek, Inc. 3164 floating-point chip.

"It looked like they had it all together," says Richard Shaffer, editor of the New York-based "Technologic Computer Letter." "[Apollo Chairman Thomas] Vandervell was being carried around on shoulders."

And then the dominoes began to tilt.

Shared labor

Worldwide installations of technical workstations in 1987, by vendor market share



SOURCE: INTERNATIONAL DATA CORP. C/SI/CMC

Within two weeks in July, the following happened:

- Citing a shortfall in sales by its West German subsidiary and a stateside slackening in the wake of the April price drop, Apollo announced impending second-quarter losses of \$5 million to \$8 million (the final figure was \$7 million); company stock plummeted.
- At least one stockholder immediately filed a class action suit in federal court, charging Apollo with securities fraud in connection with the drastic stock drop.
- Apollo's introduction of the 4-MIPS Series 3500 and the 7-MIPS Series 4500 workstations — the 4500s are the first workstations to incorporate the 33-MHz version of the Motorola, Inc. 68030 chip — was largely overshadowed by continuing questions about the company's management and stability.
- Apollo President Roland Pampel abruptly left the company, and Vandervell stepped back to the helm.

"Apollo's timing couldn't have been worse," Shaffer says. "Whichever way you look at it, they've made themselves look very foolish; they look like the gang that couldn't shoot straight."

Apollo's stumble is worsened, adds IDC's Brown, by Sun's unbroken forward pace. "Sun is coming on like an avalanche," she says, "and they're only half-way down the hill."

Blinding success

A pact between Sun and AT&T last fall sent shock waves through the workstation industry that are still being felt today. In October, Sun agreed to license its RISC-based scalable processor architecture (Sparc) to AT&T.

At the same time, AT&T announced that it would merge its Unix System V operating system with the Sun operating system, based on the University of Cal-

ifornia at Berkeley's Unix 4.2.

It didn't take long for AT&T's Unix licensees to respond. By January, AT&T was meeting with angry licensees who charged that AT&T's agreement with Sun gave the aggressive workstation vendor an advantage in the Unix marketplace.

They contended that Unix would be optimized for Sparc and that, as part of the development team for the new version of Unix, Sun could bring workstations to market using the new operating system more quickly than other licensees.

Despite AT&T's efforts to quell their fears, the licensees were not satisfied. Last spring, industry giants IBM, Hewlett-Packard Co., Digital Equipment Corp. and Apollo formed the Open Soft-

ware Foundation, a not-for-profit company that has as its charter the development of an "open" version of Unix.

Neither the controversy — nor a shortage of DRAMs — slowed Sun as it sped toward a \$1 billion year. It added Sparc licensees like Xerox Corp. and Ultras Corp. and continued to expand its own product line. In February, Sun added a desktop version of its Sparc workstation. At the same time, it was forced to raise prices on its line of Motorola 68020-based systems because of the DRAM shortage.

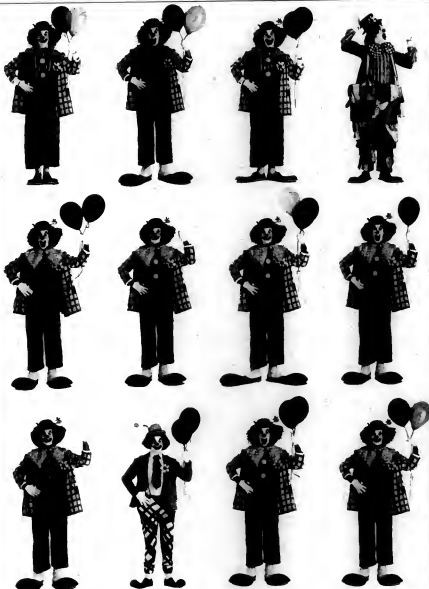
Branch out

In April, Sun launched its long-anticipated Intel Corp. 80386-based systems, which can run Unix and MS-DOS. Sun is hoping

the 386i workstations will allow it to branch out into commercial markets from the technical markets in which it has made its name.

In addition to a bad case of Sun-burn and several self-inflicted foot wounds, Apollo had a new thorn in its side this year: DEC, previously a second-tier player in the workstation market, established itself as a serious contender. If DEC hasn't displaced Apollo as the No. 2 shareholder in the U.S. workstation market as of this moment, "most [market] analysts] are predicting that they will by the end of the year," Aberdeen's Logan says.

From its autumn 1987 introduction of the Vaxstation 3200 and 3500 through the February debut of the Vaxstation 8000, DEC has continued to demonstrate



the seriousness of its oft-stated intent to be a ranking workstation supplier.

The Vaxstation 3200 and 3500 — 3-MIPS models based on the CPU used in DEC's Microvax 3500 and 3600 and priced in the \$19,000 to \$58,000 range — gave the Massachusetts minicomputer manufacturer its first substantial footing as a price/performance competitor with the Sun-3/260 and the Apollo DN4000, says IDC's Brown. The new models, she adds, also extended DEC beyond the entry level in the workstation area.

"For the first time, they can say they really have a range of systems," Brown says.

With heightened credibility in standard workstation territory, DEC made a major assault on the high ground with the Vax-

I USED TO LIVE in Texas, and we had this local football team that was always going to be next year's champion. That's the RT."

RICHARD SHAFFER
"TECHNOLOGIC COMPUTER LETTER"

station 8000, a 3-D graphics workstation codeveloped with Salt Lake City-based Evans & Sutherland Computer Corp. In- troduced a month before Stellar, Ardent and Apollo launched their minisuper workstations, the 8000 targeted a similar market — scientific and technical users performing such tasks as mechanical computer-aided engineering and molecular

modeling — but with a different strategy.

"We're not joining the glamour race — the MIPS race," said DEC President Ken Olson. "We want to have the machine that people want to use to get work done."

Leaving the forewarned MIPS to be provided by computers to which the Vaxstation 8000 was designed to connect, DEC

concentrated on delivering 3-D performance — 500,000 anti-aliased vectors per second, outdistancing Silicon Graphics' record 200,000 and bailed by at least one seasoned market observer as "spec-tacular."

Moreover, some analysts cite the DEC entry's shaded performance — 5,000 Gouraud-shaded polygons per second — as a potential competitive weakness, in light of Stellar's and Ardent's 100,000 Gouraud-shaded polygons per second.

"DEC has some real problems in the workstation area," Randolph notes. "They have to figure out how to engineer, market and sell a low-margin workstation; traditionally, DEC doesn't do 'small' very well."

Long-suffering HP users received good news in September 1987 when HP announced that it would begin to ship the HP 3000 Series 950 general-purpose system, the high end of HP's Spectrum line. HP's Spectrum systems, based on RISC, were hampered by technical problems with the operating system's I/O, which caused the workstations to be delayed by nearly a year.

At a gathering of HP's users, President and Chief Executive Officer John Young acknowledged that HP would have to be more aggressive in the marketplace against dynamic competitors like DEC.

The wild card

"I used to live in Texas, and we had this local football team that was always going to be next year's champion," says "Technologic Computer's" Shaffer. "That's the RT."

Several rounds of enhancements after its 1986 debut, IBM's entry in the workstation stakes — the RT series, now the RT Personal Computer — is "still a system looking for a market," said a recent report published by Shearson Lehman Hutton, Inc.

Toward the end of another lockout year for the RT, however, the computer now estimated by analysts as little more than a blip on IBM's bottom line and in the workstation market began to show some promising signs.

In August, IBM rolled out three new RISC-based RT models equipped with 16M bytes of CMOS memory — four times the former RT complement — and claiming as much as 25% faster processing than its predecessors. While still shy of the high-end performance and attractive price that would make the RT a workstation to contend with, say industry analysts, the June offerings served as evidence of IBM's genuine commitment to the technical workstation marketplace and to AIX, IBM's flavor of Unix.

According to company spokesmen, increased efforts to woo software developers into writing AIX-based programs are afoot at IBM. According to several market analysts, the dearth of applications is an often cited factor in the RT's also-ran status.

"I haven't given up on IBM and the RT," says Charles Foundryer, president of Cambridge, Mass.-based market research firm Daratech. "IBM at the higher levels certainly understands the RT's strategic importance and has shown itself fully capable of acting on that kind of understanding."

Foundryer says he expects to see eight RT models out by the end of this year. "If they can come up with, say, 16 by February or March, everyone will sit up and take notice." ■

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HARDWARE ROUNDUP

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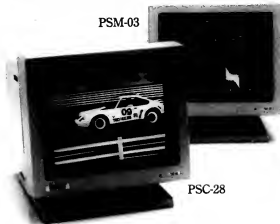
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THE VISIBLE EDGE

Conformity takes hold as small systems pass peak

BY J. A. SAVAGE

The small systems market has matured. The market's growth rate is averaging less than 10%, according to figures supplied by Dataquest, Inc. As a result, the systems are looking more like the classic textbook example of what happens in a mature market: Whether the products are computers, breakfast cereals or cars, they become standardized.

Buyers have been offered two major choices this year, and the path users choose seems to have more to do with their tolerance for adventure than with any concrete advantages of either choice. The one trend both choices have in common is that they offer some degree of standardization.

More daring users can go with standard architectures and operating systems offered by a gaggle of smaller vendors. Open standard architecture, like that based on Intel Corp.'s 80386 processors

standardized hardware, and certainly the one most speculated on, was IBM's AS/400, offering SAA, which is supposed to bridge migration from the low end to the high end so that applications can grow without changing architectures.

But while IBM calls it a standardization of hardware, the AS/400 is still a propri-

etary hardware standard, offering to run a few open standards interfaces like SQL. In other words, the standardization is only good for those users who are already in the IBM world.

The AS/400, too, may be used as both file server and minicomputer through its built-in token-ring local-area network adapter. It has four models at the low end, accommodating from four to 48 users.

Most of the early customers for the low-end AS/400 models have been users migrating either to expand capacity or to consolidate the work of several System/36s. But analysts and consultants, such as Cynthia Boucher, technical manager at San Francisco-based Computer Resources Group, Inc., predict that the growth potential within the line will at-

tract many first-time users.

Boucher, however, is not sure that this is really the best of all possible moves for first-timers. IBM, she warns, is moving the onus of technical expertise into the customer's court. Besides, she explains, although she has worked closely with the new system, she has yet to see that the AS/400 offers any more functionality than the System/36 or 38.

While the AS/400 is still too new to get an idea of how bristly it is selling, analysts predict the system will take over what little market remains for IBM's 9370.

"In our cost-of-ownership study, the 9370 was simply the most expensive system for equivalent functionality, and it's getting pricier by the day," says Marty Gruba, an analyst at Phoenix-based

SMALL SYSTEMS

running the Unix operating system, offers the comfort of a larger pool of young technicians and an open-air bazaar of applications from which to choose.

The less adventurous can wrap themselves in the warm blanket of proprietary "standards" backed by the big hardware vendors, while maintaining the option of some software standardization.

Choices such as the entry-level IBM AS/400s offer a secure growth path but afford users a smaller pool of technical solutions to support them.

The big players, like IBM, Digital Equipment Corp. and Hewlett-Packard Co., pursue their proprietary architecture kingdoms with standards like IBM's Systems Applications Architecture (SAA) and HP's Spectrum reduced instruction set computing-based architecture, or RISC.

Many of the smaller vendors' systems introduced this year are designed around Intel's 80386, giving the appearance of 386 standardization. Vendors have not flocked to Motorola, Inc.'s standard processor, the 68030, introduced earlier this year, although analysts say this processor is equal to, if not better than, Intel's. The 386 processor has a comfortable reputation as a commercial architecture, and the system is bought for its reputation, not for its functionality, says Jeanette Sill-Holman, an analyst at Santa Clara, Calif.-based Infocorp.

Integration duty

Besides the rush to standardization, another curious trend appeared in the past year. Following the proliferation of office PCs, users have forced a change in the role of small systems. The box that used to be plopped in the back room hosting dumb terminals is now more often posted for duty as a file server to integrate personal computers and workstations.

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Savage is a Computerworld West Coast correspondent.

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Conformity

FROM PAGE 85

The Sierra Group, Inc. Digital Equipment Corp.'s Microvax II continues to be the strongest DEC product offering at the low end. "It's the workhorse of the family," says Bob Randolph, director of program services at Westford, Mass.-

based Technical Financial Services, Inc.

The Microvax 3500 and 3600 have cache memory, while comparable AS/400 models, the B40 and B50, do not.

Conversely, DEC's lower end Microvax II and Microvax 2000 can handle less than half the disk storage of comparable AS/400s—the Models B10, B20 and B30.

DEC products are the antithesis of HP's RISC architecture, embodied in the Spectrum series introduced in April, according to a report from New York-based Sanford C. Bernstein & Co. The two different architectures require radically different methods of applications.

"While HP has to add things to tailor its machines to particular markets, DEC subtracts

them," the report says. "The Microvax II implements about half the instructions in the processor but makes the others available in software."

The one 'IP RISC-based machine that is currently available at the low end—the 925—appears to be selling well and may even be attracting new commercial HP customers, analysts say. For HP's loyal base, the machine

provides relief for those users who need to migrate to larger systems. Infocorp analyst Sandra Gant says.

HP also introduced non-RISC machines at the low end and cut prices nearly in half for those who want to buy into HP's traditional architecture.

While RISC architecture is HP's forte into standardization, it still uses a proprietary operating system.

RISC architecture has been played up in the press, particu-

SCIENCE/SCOPE

Tiny infrared detector arrays are one hundred times more sensitive than current detectors, and enable astronomers to observe very faint infrared-radiating sources, even using relatively small telescopes. The Hughes Aircraft Company-built arrays, sensing infrared radiation, can penetrate the thick gas and dust that obscure our galaxy's star-forming regions. The arrays are expected to provide a clearer picture of the center of the galaxy, which many astronomers believe is hiding an enormous black hole obscured by gas and dust. The new detector arrays should also help in the search for elusive, failed stars called brown dwarfs. Brown dwarfs lack the mass to start hydrogen burning in their cores and are invisible to optical astronomy.

A new Probeye® thermal video system achieves true portability by using thermoelectric cooling, which eliminates the need for gas or liquid nitrogen supplies. Using rechargeable batteries, the Probeye Model 7100, built by Hughes, is a complete thermography system that provides a visual display of the temperature distribution of a scene being viewed by the infrared imager. The Model 7100 features enhanced capabilities to provide more information and a wider range of applications than previous thermal video systems, and provides a display resolution of 240 infrared scan lines—four times greater than previous Probeye viewers.

A network of "smart" digital battlefield radios provides accurate battlefield positions to U.S. Marines and their commanders, letting them know at all times where they and friendly forces are located. The Position Location Reporting System (PLRS), developed by Hughes for the U.S. Army and Marine Corps, consists of master stations, and specialized radios that can be hand carried by a Marine in the field, mounted in vehicles or aboard aircraft. PLRS weighs approximately 23 pounds, and includes a battery, antenna, and readout device. Master stations include a radio and computer suite, are self-contained except for prime power, and designed for rapid deployment by ground vehicles or aircraft.

A new satellite is providing domestic communications to most of the South Pacific and added coverage to Australia. Aussat 3, designed and built by Hughes, is the last in a fleet of three communications satellites for AUSSAT Pty. Ltd., Australia's national satellite company. The satellite will augment voice, video, and data services currently provided by the first two satellites in Australia, its offshore islands, and New Guinea. Aussat 3 has a three-reflector antenna to produce seven transmit beams for regional and national coverage. Additionally, two horn antennas provide coverage to New Zealand and South Pacific islands. The Aussat satellites tie together the nation's 101 air traffic control stations, provide business communication networks, and are used in medical emergencies through aids such as slow-scan television for diagnostic purposes.

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USERS OF small systems apparently care little about what operating system or architecture is offered, just so long as their applications run well.

lary with introductions of two Unix-based systems by Sunnyvale, Calif.-based Mips Computer Systems, Inc.

But Infocorp's Sil-Holeman and other analysts say that for the next couple of years the architecture will not be much of a factor in users' buying decisions, with the possible exception of Mips at the low end.

The two new Mips systems are a 12 million instruction per second (MIPS) system introduced in May and a 20 MIPS system introduced in July at \$2,500 and \$5,900 per MIPS, respectively. The system at the low end can handle between 10 and 75 users, the one at the high end between 25 and 150, depending on the application.

Texas Instruments, Inc. does not appear to be pursuing any of the paths of other vendors. It has not announced adherence to standards, nor have its new models incorporated during technologies like RISC.

In the past year, TI introduced five new models in its 17-year-old Business Systems series, based on a proprietary processor, and reduced prices on its older models.

Whatever works

While most small systems vendors bet on Unix-based systems this year, two decided to take a different tack. Prime Computer, Inc. incorporated three operating systems—Unix, Pick and MS-DOS—in its EXL 316. And Data Voice Solution Corp. took a stand in the MS-DOS world with its Centaur II mini.

Small systems vendors may feel software standards are necessary in order to be part of the game.

But users of these systems apparently care little about what operating system or architecture is offered, as long as

Continued on page 92

PCs, WORKSTATIONS AND SMALL SYSTEMS

HARDWARE ROUNDUP

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET	MOST COMPATIBLE DEC OR IBM SYSTEM	PERFORMANCE (MIPS)	MACHINE CYCLE TIME (NSEC)	MEMORY RANGE (MEO/BYTES)	DISK TRANSFER RATE (MEO/SEC.)	DISK CAPACITY (MEO/BYTES)	NUMBER OF PORTS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Computer Graphics, Inc. (714) 855-7333	Power 3000	September 1987	DP, CA	Microvax II	8	20	4-36	30	100-400	36-48	Unix System V	30	15-20	32	\$95,000 with 640 Kbytes memory, 10MB disk, 20MB tape, 50 ports, operating system
	Power Server 300/400	May 1989	DP, CA	750 Model 30	5	20	3-40	30	50-150	0-64	Unix System V	30	0-50	32	\$11,500 with 384 Kbytes memory, 80MB tape disk, 10MB tape head, 40MB ports, Unix System V
Computer Designed Systems, Inc. (813) 844-3555	Adrian 2100, 2150, 2190-2	June 1987	DP, TP	VAX 8600 series	30	40	120-250	30	30	1,300	Chaos, Unix System V	1,500+	400	34	\$10,000 with 1024 Kbytes memory, one terminal, 80MB tape disk, four ports, power supply
	Adrian 25 series	1989	DP, TP	Microvax Systems 30, 35	0-14	30	3-50	30	30	30	Unix	30	20-30	16-32	\$11,800 with 134 Kbytes memory, one terminal, 40MB tape disk, 80MB tape drive, four ports, power supply
Corningpak Performance, Inc. (800) 555-3543	Piper Series 300	September 1988	DP, TP	Microvax II	1.3/2.0	300	3-4	0	30	0-30	CTOS	30	0-50	30	\$7,000 with 256 Kbytes RAM, six ports
	Piper Series 300	January 1987	DP, CA	System/360	0.5/0.8	120	3-6	0	30	0-30	CTOS	30	10	30	\$6,000 with 384 Kbytes RAM, six ports
	Piper Series 300	June 1989	DP, CA	System/360	0.5/0.8	120	3-6	0	30	0-30	CTOS	30	10-20	30	\$6,000 with 400 Kbytes memory, six ports
	Server PC Model 100	June 1988	DP, CA	PC AT compatible	0.5/0.8	100	3-10	0.3	30	30	CTOS/MS-DOS 3.1, MS-DOS	30	10	30	\$8,400 with 384 Kbytes memory, 40MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Server PC Model 200	May 1987	DP, CA	PC AT compatible	0.5/0.8	100	3-10	0.3	30	64	CTOS/MS-DOS 3.1, MS-DOS	30	10	30	\$10,400 with 400 Kbytes memory, 140MB tape disk, 10MB tape drive, three serial ports, one parallel port, CPU port, CTOS/MS-DOS
Cobit Corp. (714) 950-7911	Q30 386	March 1989	DP, SE	IBM XT, Standard VLS	3	100	4-16	17	6400-6.25	10-32	Unix System V.3	5	10	8	\$4,100
	Q30 386	June 1989	DP, SE	IBM XT, Microvax II	3	100	2-20	17	64 386	8	Unix System V.3	5	10	8	\$4,900
Data Guard Corp. (202) 340-0711	MPV900 SP	1987	DP, CA, ME, TP	Microvax II	1.6	300	3-14	1.0/2.0	30	120	ADP/MS-DOS, ADP/MS-DOS	30	20-30	30	\$10,000 with 384 Kbytes memory, 30-disk drive, power supply, 100-disk drive
	MPV900 DCE	1987	DP, CA, ME, TP	Microvax II	1.6	300	3-14	1.0/2.0	30	48	ADP/MS-DOS, ADP/MS-DOS	30	20-30	30	\$10,000 with 384 Kbytes memory, 30-disk drive, power supply, 100-disk drive
Datacube Corp. (800) 880-1870	MTS/3860 Model 40	December 1987	DP, CA, SE, TP	System/360, VAX 8600	3	30	0-32	30	4-36	ADP/MS-DOS, ADP/MS-DOS	130	40-50	30	\$11,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS	
	CMC/700 Model 200	NP	CA	NP	3	100	3-10	10	170	6	Unix System V	32	10	32	\$11,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
Datacube Corp. (813) 880-7660	7700	July 1988	DP, CA, TP	NP	4	62.5	0-16	1.5	75-150	8	EMULSA	10-50	0-10	30	\$11,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	7800	May 1988	DP, CA, TP	System/360, Microvax II	7	62.5	0-16	1.5	30	80	EMULSA	30	10	30	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
Digital Equipment Corp. (617) 351-0000	VAX 8600	March 1987	DP, CA, SE, TP	NP	1.0/1.5	100	10-120	2.0	250	NP	VMS, Ultrix-32	NP	10-70	32	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Microvax 3000	1987	DP, CA, SE, TP	System/360 Model 30, VAX 8600, Model 30, Model 30, Model 30	0.5/0.8	NP	10-120	2.0	250	NP	VMS, Ultrix-32, VAX ELN	NP	10-70	32	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Microvax 3000	1987	DP, CA, SE, TP	System/360, VAX 8600, Model 30, Model 30, Model 30	0.5/0.8	NP	10-120	2.0	250	NP	VMS, Ultrix-32	NP	10-70	32	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Microvax 3000	1987	DP, CA, SE, TP	System/360, VAX 8600, Model 30, Model 30, Model 30	0.5/0.8	NP	10-120	2.0	250	NP	VMS, Ultrix-32, VAX ELN	NP	10-70	32	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Microvax II	1989	DP, CA, SE, TP	System/360, VAX 8600, Model 30, Model 30, Model 30	0.5/0.8	NP	10-120	2.0	250	NP	VMS, Ultrix-32	NP	10-70	32	\$10,000 with 384 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
Dynatech Computer Systems (619) 960-7000	Ch 760	NP	DP, SE	NP	8	80	0-32 (up to 64 ports)	10-15	40	70+	Unix V.3	70+	10	30	\$40,000
	System 2000/Model 40	June 1987	DP, CA, SE, TP	NP	NP	NP	2-4	136-414	NP	6-30	Unix	62	10-15	32	\$15,750 with 128 Kbytes memory, 120MB tape disk, eight ports, 60MB tape drive, four ports
Palmer American, Inc. (608) 434-1100	System 1400/32	July 1989	DP, CA, SE, TP	NP	NP	NP	2	130-434	NP	10-24	Unix	84	10-40	32	\$10,500 with 128 Kbytes memory, 120MB tape disk, 10 ports, 60MB tape drive, four ports, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	System 2500/Model 40	NP	DP, CA, SE, TP	NP	NP	NP	2-10	130-434	NP	34-96	Unix	80	34-64	32	\$10,500 with 128 Kbytes memory, 120MB tape disk, 10 ports, 60MB tape drive, four ports, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	System 2500/Model 40	September 1987	DP, CA, SE, TP	NP	NP	NP	2-10	130-434	NP	10-24	Unix	84	10-40	32	\$10,500 with 128 Kbytes memory, 120MB tape disk, 10 ports, 60MB tape drive, four ports, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	System 1100/Model 30	June 1989	DP, CA, SE, TP	NP	NP	NP	1	47	NP	3-16	Unix	10	3-10	32	\$10,500 with 128 Kbytes memory, 120MB tape disk, 10 ports, 60MB tape drive, four ports, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
General Automation, Inc. (714) 477-4000	Sales 1200	First-quarter 1989	DP	Advan	NP	80	0.1/0.2-1.0	0	30-67	0-13	Unix	12	0	16, 30	\$8,200 with CPU, 80 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Sales 1200	March 1989	DP	Advan	NP	80	0-2	0	30-100	0-10	Unix	10	0	16	\$8,200 with CPU, 80 Kbytes memory, 10MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	Sales 1200	September 1987	DP	Advan	NP	80	3-4	0	141-400	0-30	Unix	30	10	30	\$11,000 with 128 Kbytes memory, 120MB tape disk, 10 ports, 60MB tape drive, four ports, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
Gervie Corp. Computer Systems Division (800) 4-5435	MC-3 Model 80	March 1989	SE	Microvax II	4.1	80	3-4	0.000-1.20	80-240	4-12	Unix System V	32	2-12	32	\$10,700 with CPU, 80 Kbytes memory, 120MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS
	MC-3 Model 80	March 1989	SE	Microvax II	4.1	80	3-4	0.000-1.20	80-240	4-12	Unix System V	32	2-12	32	\$10,700 with CPU, 80 Kbytes memory, 120MB tape disk, 10MB tape drive, two serial ports, one parallel port, CPU port, CTOS/MS-DOS

HARDWARE ROUNDUP

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PCs, WORKSTATIONS AND SMALL SYSTEMS
HARDWARE ROUNDUP

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET*	MOST COMPARABLE DEC OR IBM SYSTEM	PERFORMANCE (MIPS)	MACHINE CYCLE TIME (NSEC)	ADDRESS RANGE (ADDRESS/115)	DATA TRANSFER RATE (MAGNIFY/SEC.)	DISK CAPACITY (MAGNIFY/115)	NUMBER OF PORTS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
IBM 8000 240-5400	9075 Model 30	July 1987	DP, OL, SE, TP	NA	8.5	NP	0.34	NP	NP	NP	VS/SP, VS/SP, VS/SP, VS/SP	NP	30-60	32	\$10,500 with 68K bytes memory
	9075 Model 40	October 1987	DP, OL, SE, TP	NA	8.5	NP	0.49	NP	NP	NP	VS/SP, VS/SP, VS/SP, VS/SP	NP	NP	32	\$11,200 with 128K bytes of memory
	9075 Model 60	October 1987	DP, OL, SE, TP	NA	5.3	NP	0.91	NP	NP	NP	VS/SP, VS/SP, VS/SP, VS/SP	NP	NP	32	\$17,000 with 512K bytes of memory
	9075 Model 80	October 1987	DP, OL, SE, TP	NA	5.3	NP	0.91	NP	NP	NP	VS/SP, VS/SP, VS/SP, VS/SP	NP	NP	32	\$21,000 with 512K bytes of memory
Ism International, Inc. (800) 644-4368	Ism 2000/5	July 88	DP, OL, TP	MicroVax II, IBM XT	2.5	187	4-48	1.5	180-414	16	Unix BSD 4.3, Unix System V.3, Pcs 803 + JAC-DOS	16	16	32	NP
	Ism 2000	January 1988	DP, OL, TP	MicroVax II, IBM XT	2.5	187	4-48	1.5	180-414	32	Unix BSD 4.3, Unix System V.3, Pcs 803 + JAC-DOS	69	32	32	NP
	Ism 3000	March 1987	DP, OL, TP	VAX 6500	4	130	4-48	1.5	180-414	64	Unix BSD 4.3, Unix System V.3, Pcs 803 + JAC-DOS	64	48	32	NP
	Ism 4000	March 1988	DP, OL, TP	VAX 6500, 6500	4	130	4-113	3	180M-190	128	Unix BSD 4.3, Unix System V.3, Pcs 803 + JAC-DOS	128	80	32	NP
M&I Data Processing, Inc. 714-671-6200	M&I 1000	October 1987	DP, TP	NP	NP	69 MHz	1.0-6.5	5	32-650	49	MS-DOS, PC-DOS	10	0-10	32	\$8,200 with 1.4MB bytes memory, 100K-byte disk, monitor, operating system
	M&I 2000	October 1988	DP, TP	Altavox Model 800	NP	69 MHz	1-4	8	64-180	53	ROMAULT	30	0-4	32	\$10,000 with 1.4MB bytes memory, 400K-byte disk, no serial ports, no parallel port, power supply
	M&I 3000	December 1988	DP, TP	Altavox Model 800	NP	20 MHz	Up to 30	5	75-400	53	ROMAULT	50	0-40	32	\$14,000 with 1.4MB bytes memory, 400K-byte disk, no serial ports, no parallel port, power supply
	M&I 4000	January 1988	DP, TP	Altavox Model 800	NP	20 MHz	0-40	5	400-1100	73	ROMAULT	74	10-50	32	\$40,000 with 1.4MB bytes memory, 500K-byte disk, no serial ports, 800K parallel port, power supply
	M&I 7100 series	March 1987	DP, OL, TP	Altavox Model 800	NP	100	0-4	5 MHz	16000-1.20	32	ROMAULT	30	30	32	\$14,000 with CPU, 68K bytes memory, 400K-byte disk, no serial ports, 800K parallel port, power supply
	M&I 8000 series	January 1988	DP, OL, TP	Altavox Model 800	NP	100	0-33	5 MHz	16000-1.40	312	ROMAULT	312	30	32	\$21,000 with CPU, 68K bytes memory, 400K-byte disk, no serial ports, 800K parallel port, power supply
	M&I 9000 series	January 1988	DP, OL, TP	Altavox Model 800	NP	100	0-33	20 MHz	16000-1.40	300	ROMAULT	300	30	32	\$21,000 with CPU, 68K bytes memory, 400K-byte disk, no serial ports, 800K parallel port, power supply
	Advanced Series 60	June 1988	DP, OL, TP	Altavox Model 800	NP	60	0-10	69 MHz	16000-1.20	156	ROMAULT	150	30	32	\$71,000 with CPU, 68K bytes memory, 400K-byte disk, no serial ports, 800K parallel port, power supply
McDermott Douglas Computer Systems Co. (714) 530-1000	Series 6000	1984	OL	MicroVax II, System 30	32	130	512K-400	5-60	NP	6-120	Lotus	100	50	16	\$17,000 with CPU, 1.2MB bytes memory, 400K-byte disk, no serial ports, 800K parallel port, power supply
	McDermott	August 1988	SE	VAX 6500	60	40	0-100	5	270	60	ROMAULT	NP	NP	32	\$11,000 with 256K bytes memory, 1712K-byte disk, cartridge tape, operating system
	M&I 100	June 1988	SE	MicroVax 6500	10	40	0-40	1	30	60	ROMAULT	NP	NP	32	\$20,000 with 512K bytes memory, 1712K-byte disk, cartridge tape, operating system
Modular Computer Systems, Inc. (303) 976-1390	Classic 3/15	1984	SE	NA	0.3	400	1/2 to 2	NP	NP	NP	Mac II	16	50	NP	\$11,500 with 512K bytes memory
	Classic 3/25	1982	SE	NA	0.3	250	1/2 to 2	NP	NP	NP	Mac II	64	NP	16	\$27,300 with 512K bytes memory
	Classic 3/45	1982	SE	NA	0.7	250	1/2 to 2	NP	NP	NP	Mac II	128	NP	16	\$40,000 with 1M bytes memory
	Classic 3/75	1982	SE	NA	1	125	1-4	NP	NP	NP	Mac II	256	NP	16	\$60,000 with 1M bytes memory, 1M-byte disk, cartridge tape, power supply
	Power 45	1987	SE	NA	0.7	250	1/2 to 2	5	NP	NP	Mac II	160	NP	16	\$72,000 with 256K bytes memory, 1600K-byte disk, cartridge tape
Munro, Inc. Computer Systems Division (408) 255-0000	System 6000 Model 800	September 1988	OL, TP	NP	6.5	NP	0.40	0	2,400	0-120	Unix System V.3	120	60	NP	\$81,300 with 512K bytes memory, two ports, power supply
	System 6000 Model 600	September 1988	OL, TP	NP	6.5	NP	0.52	9	2,300	0-48	Unix System V.3	30	0-48	NP	\$14,000 with 512K bytes memory, two ports, power supply
	System 6000 Model 510	September 1988	OL, TP	NP	4.3	NP	0.8	1.3	2,300	0-48	Unix System V.3	60	0-60	NP	\$17,000 with 1M bytes memory, two ports, power supply
	System 6000 Model 310	April 1988	OL, TP	NP	4.3	NP	0.4	1.38	866	0-42	Unix System V.3	60	0-42	NP	\$8,000 with 1M bytes memory, two ports, power supply
	System 6000 Model 400	June 1988	OL, TP	NP	3.3	NP	0.18	1.6	866	0-48	Unix	60	30	32	\$14,000 with 512K bytes memory, two ports, power supply
	System 6000 Model 100	June 1987	OL, TP	NP	3.3	NP	0.4	0.12	342	0-20	Unix	20	0-20	32	\$4,000 with 512K bytes memory, two ports, power supply
	System 6000 Model 110	January 1988	OL, TP	NP	3	NP	0.4	0.12	342	0-4	Unix	30	0-4	32	\$5,000 with 512K bytes memory, 670K-byte disk, 600K-byte tape drive, two ports, power supply
NCE Corp. (Camberland NCE office)	Tower 32100	Third quarter 1988	DP, OL, NP	NP	NA	1-2	NP	102	4	Units	4	4	32	\$24,500	
	Tower 32100	May 1988	DP, NP	NA	6.0	2-10	1.8	780	64	Unix System V	64	16	32	\$24,500	
	Tower 20450	May 1988	DP, NP	NA	4.0	2-10	1.5	380	32	Unix System V	32	8	32	\$14,500 with application processor, data storage processor, 80K bytes memory, 15-100MB hard disk, operating system	
	5811	NP	DP, TP	System/36, 9370, 4381	1	140	0-32	1.3	NP	10-12	VS/SP	NP	NP	32	\$80,000 with two application processors, data storage processor, 128K bytes memory, 17.1M-byte disk, 400K-byte tape drive, operating system
	5821	NP	DP, TP	System/36, 9370, 4381	2	140	13-48	1.5	NP	17-20	VS/SP	NP	NP	32	\$90,000 with two application processors, data storage processor, 128K bytes memory, 17.1M-byte disk, 400K-byte tape drive, operating system
NRC Information Systems, Inc. (303) 354-0000	9000 Extended Support Processor	NP	DP, TP	NA	NP	250	1-16	6	NP	48	Unix	32	16	32	\$25,000 with 512K bytes memory, 1.2MB-byte floppy disk drive, eight ports, 800K-byte disk drive, 400K-byte tape drive, operating system
	Atom Micro 3L	February 1988	LP	MicroVax	1-6.5	NP	0-4	10-20	500	5	Am-IX	28	5	40	\$6,000 with 512K bytes memory, 1.2MB-byte floppy disk drive, eight ports, 800K-byte disk drive, 400K-byte tape drive, operating system
	Atom 3L2L	February 1988	LP	MicroVax	1-6.5	NP	0-10	10-20	500	6	Am-IX	6	4	32	\$6,000 with 512K bytes memory, 1.2MB-byte floppy disk drive, eight ports, 800K-byte disk drive, 400K-byte tape drive, operating system

HARDWARE ROUNDUP

[illegible]

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET	HIGHEST CONFIGURABLE DEC OR IBM SYSTEM	PERFORMANCE (MIPS)	MACHINE CYCLE TIME (NSEC)	MEMORY RANGE (MEGABYTES)	DATA TRANSFER RATE (MEGABYTES/SEC)	DISK CAPACITY (MEGABYTES)	NUMBER OF PORTS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Sierra Corp. (312) 843-8811	UNIQUEP/32	June 1988	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	33	4-89	3.3	17000-4.90	64	Unics System V	64	30-32	32	\$32,000 w/ CPU, 64K bytes memory, 17000-byte disk, 10000-byte tape, eight-port adaptive router interface
	UNIQUEP/32	January 1988	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	33	4-84	3.3	17000-4.90	64	Unics System V	64	30-34	32	\$32,000 w/ CPU, 64K bytes memory, 17000-byte disk, 10000-byte tape, 14 communications lines
	UNIQUEP/32	January 1988	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	33	4-84	3.3	32768-6.10	64	Unics System V	64	30-34	32	\$34,500 w/ dual CPUs, 64K bytes memory, 17000-byte disk, 10000-byte tape, 14 communications lines
	UNIQUEP/32	January 1988	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	33	4-84	3.3	32768-6.10	128	Unics System V	128	30-34	32	\$38,000 w/ CPU, 64K bytes memory, 32768-byte disk, 10000-byte tape, 14 communications lines
	UNIQUEP/32	January 1988	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	33	4-84	3.3	32768-6.10	128	Unics System V	128	30-34	32	\$43,000 w/ dual CPUs, 64K bytes memory, 32768-byte disk, 10000-byte tape, 14 communications lines
	326	March 1987	DP, TP, CA	Siemens/32 AltiVec/Micro R. Microver 2600	NP	16	1-4	6.4	80	2000	RTOS, MVS-DOS	32	15-64	16, 32	\$1000 w/ low memory, group work, data base
Wang Laboratories, Inc. (617) 450-0000	V5 5000	July 1988	DP, CA, TP	AS/400, 3270, Microver 2. VLS 2000	NP	25-12.3	1-16	1.25	10-16	5000	VMS, DMS	32	10-14	32	\$2,400 w/ 100K memory, CPU 25, 100K tape, 7200-byte disk, 10000-byte tape
Wang Systems, Inc. (617) 450-1144	Wise 5-2300	January 1988	DP, CA, TP	VLS-12/700	4	340	4-12	10 Mbps	80-800	4-16	Unics System V, VMS	64	23	32	\$25,700 w/ dual CPUs, 64K bytes memory, 80000-word expansion, 8000-byte disk
	Wise 5-2300	January 1988	DP, CA, TP	VLS-12/700	4	340	4-12	10 Mbps	80-800	4-16	Unics System V, VMS	64	23	32	\$18,000 w/ dual CPUs, 64K bytes memory, 80000-word expansion, 8000-byte disk
	Wise 5-2300	January 1988	DP, CA, TP	NP	4	340	4-12	10 Mbps	800-800	30-60	Unics System V, VMS	64	30	32	\$23,200 w/ 12 ports, 64K bytes memory, 80000-word expansion, 8000-byte disk
	Wise 5-2300	January 1988	DP, CA, TP	VLS-12/700	4	340	4-12	10 Mbps	800-800	4-16	Unics System V, VMS	64	30	32	\$23,200 w/ low ports, 64K bytes memory, 80000-word expansion, 8000-byte disk

Conformity

FROM PAGE 86

their applications run well.

Since small users do not usually have the resources in-house to handle new applications programming or migration, outside help most likely will be called in. Thus, the possibility of finding contract labor familiar with a particular operating system matters more than the beauty of the operating system.

The urge to serve

As mentioned earlier, the low-end minicomputer is being pushed into a new role in the cor-

poration, that of file server. According to Sierra Group's Gruhn, this push is coming from users who are saying, "I have all these PCs, and I own a database; what I need is a file server."

Looking at the past year's worth of product releases and listening to rumors of products yet to come, it is apparent that vendors are leading what users are saying. Almost all of the small systems vendors are trying to downsize their machines and work them into a file server position.

About a dozen Intel 80386-based low-end computers that can function as either a mini or a file server were introduced in

the past year. Most have included the standard Unix operating system.

These include Alton Computer Systems, Inc.'s Series 1000 and Model 20; Cubix Corp.'s 3/386; Counterpoint Computers, Inc.'s System 15; Corollary, Inc.'s 386/MP; Proteus Technology Corp.'s System 3400M; and Teradata Corp.'s DBC/1012 Model 3.

Data General Corp. and Wang Laboratories, Inc. are also actively pursuing PC integration, allowing their low-end computers to serve, rather than master, desktop machines.

DEC's Microvaxes, including the recently introduced 3500s and 3600s, can also be used as file servers in a local-area Vax-cluster.

As noted, IBM's AS/400 can be used as a file server or minicomputer.

Sierra Group, which does an annual price/performance critique, including maintenance and the cost of software, finds this year that the overall price cuts have been steepest in the 50- to 100-user machines.

"The conventional wisdom is that the price drops have been at the low end," Sierra's Gruhn says, "but in reality the [50- to 100-user] systems dropped 20% in effective cost." Overall, Gruhn says, prices have dropped about 5% in the past year, while vendors are bundling more functionality into the machines.

The largest cost savings has been in hardware maintenance. Now most users are able to count on more than a 50% reduction from 1986 levels.

Users worry about the total cost of owning a system after new is bought. For new customers, total price matters, but it means little if users don't know what they are getting for that price.

Realistic benchmarking is an important issue in any class of machines, but it is even more crucial for the small user with a

THE PAST FEW years have not exhibited any signs of the "shake-out" of low-end vendors that the industry has been watching for.

small pocketbook who must pay particular attention to obtaining the best deal for the application. MIPS ratings may tell you how fast a CPU can run, but that can be like knowing how fast one can rev up a car's engine in neutral: These ratings are of little use in finding the speed of certain applications.

This annoyance has yet to bring a cohesive standard of measurement to the industry, but it is one step closer. Benchmarks, or some tangible numbers with which to measure the performance of competitive systems, have become important to the vendors as well as users during the past year.

In August, seven hardware and software companies announced the formation of the

Transaction Processing Performance Council. Perhaps by next year, the committee will have a more standardized benchmark to help with buying decisions.

The past few years have not exhibited any signs of the "shake-out" of low-end vendors that the industry has been watching for. Instead of small companies disappearing off the face of the earth, the industry is beginning to see consolidations.

Infocorp's Sid Haleman notes that rather than the high-profile acquisitions, such as the merger between Unisys and Convergent Technologies, Inc., most consolidations are of the agreement or partnership nature, where symbiosis can offer more than individual presentations.

Since the beginning of 1988, there has been a flood of marketing, distribution and software development agreements between companies.

For instance, Alton announced cooperation with Pick operating systems software vendor, a move that allows testing and certification for the software products. Floating Point Systems, Inc. bought up the remnants of Celery Computing, so those with Celery systems aren't left hanging out to dry without support for their equipment.

This trend toward cooperation and consolidation offers a broader range of applications that are more likely to run well on the hardware involved. It also gives users who buy from small companies more assurance that someone will survive to service their machines. *

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13. Others _____ (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Type of equipment with which you are personally involved either as a user or vendor of computer:
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B. Microcomputers/Small Business Computers
C. Microcomputers/Workstations
D. Communications Systems
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F. No Computer Involvement

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- 1. BUSINESS INDUSTRY** (Circle one)
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11. Financial Institution
12. Insurance
13. Medical/Life Sciences
14. Wholesale/Retail Trade
15. Business Service (except DFI)
16. Government — State/Federal/Local
17. Communications Systems/Public Utilities
18. Transportation
19. Mining/Construction/Restoration/Logging/Agriculture
20. Manufacturer of Computers/Computer Peripherals
21. Systems or Peripherals
22. Computer & DF Services, including Software Services
23. Business Time Sharing/Consulting
24. Computer Peripheral Dealer/Distributor/Reseller
25. Vendor Other _____ (Please specify)

- 2. TITLE/FUNCTION** (Circle one)
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11. Dir. Mgr. Supv. S.M.S./DF Services
12. Dir. Mgr. Supv. of Operations/Planning
13. Dir. Mgr. Supv. of Systems
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15. Programmer/Methods Analyst
16. Dir. Mgr. Supv. Other _____
17. Data Comm. Network Systems Mgr.
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11. Vice President/Asst. VP
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OTHER PROFESSIONALS
10. Consulting Mgr.
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IN DEPTH

When your top execs want sales, cost data — fast

Case study: Financial planning setup helps Lotus provide management with critical info

BY HARRY ANDERSEN

How can your company's top managers get the most valuable financial information from computer systems? It all depends on what information they want and how they want to access it.

When I joined Lotus Development Corp.'s finance group as controller in mid-1985, upper management had just begun to take a different view of financial controls. Until then, simply keeping up with the company's growth had been about as much as the finance group could handle. Revenue had jumped from \$53 million in 1983 — the company's first full year of operation — to \$225 million in 1985.

By 1986, though, growth was starting to settle down to an annual rate of 25% to 30%, and we had breathing space to concentrate more fully on financial planning. Soon we realized — possibly because we were unable to provide top management with information as quickly as we wanted to and they wanted it — that we needed to devise a new financial planning system.

Several additional issues brought the point home. For one, fast access to financial data on such business factors as sales, currency fluctuations and other cost drivers is crucial in a growing company. Yet the growth

Andersen is corporate controller and chief accounting officer at Lotus Development Corp. For more than 16 years before joining Lotus, he held various management positions in finance and manufacturing at General Electric Co.



JAMES HOGAN

had also kept Lotus in a state of almost constant change. The company was going through at least one major reorganization a year as well as assimilating new organizations through acquisition, and we in finance couldn't respond fast enough.

Starting from scratch

Why? Consider the situation in which the chief executive officer asked to see operating costs for the information services division, with comparisons with the previous year's costs, budget projections for the current year

and forecasts for the next year. But three months before the CEO's request, information services had been reorganized, splitting off two groups and putting them in another part of the company.

To meet the CEO's request, we had to recast data from the previous year's totals to reflect the reorganization, as well as rework any budget projections made before the reorganization took place.

The difficulties with reorganizations point to yet another set of problems: the contradiction

between the kinds of financial reports top management wants and those the accounting department needs to produce.

Top management wants an almost infinitely flexible way of looking at corporate performance — by product line, division or even geographical region when useful. But the corporation has to maintain precise historical information for government and shareholder reports — data that provides a clear and precise trail for audit purposes.

For the most part, the transaction-oriented ledger software

- What they need, when they need it
- A flexible way of examining performance
- Eliminate marathon work weekends

that most accounting departments use is ill equipped to generate the kinds of plans and forecasts that management needs to see.

The old days

Until the new system was set up, the way we produced monthly management reports was by taking data, mostly from the Digital Equipment Corp. Vaxcluster-based ledger, and manually keying it into Lotus' Symphony spreadsheets and then running the reports. The process took several people-days of effort and often fell on a weekend. It was a cumbersome task and frequently introduced errors. And whenever a reorganization took place, everything had to be changed by hand. Changes were penciled in on printouts,

and then the whole thing had to be re-keyed manually.

There had to be a way to cut down the manual work, ensure accuracy and give us more flexibility. With help from Research & Planning, Inc., a management consulting firm in Cambridge, Mass., we decided to design and install a new system geared specifically to management reports, planning and analysis.

It would start with a database that could integrate information from the ledger and other company records and automatically feed it into redesigned spreadsheet-generated reports. The database would be easy to restructure, making even large-scale reorganizations relatively simple to handle.

We started creating the master data-

base and integrating it with the ledger systems in early 1987 by customizing a VAX-based management information program Lotus already owned. Right away, this undertaking brought yet another problem to light. Until then, some financial information was not centralized but was maintained in other geographic locations. And since not everyone was using the same account structures, the figures weren't readily combined.

For example, our European divisions had devised their own structures for organizing operating expenses. They were different enough from ours at the home office to complicate the task of drawing up overall totals.

Indeed, before we could feed their data into our computer system, we had to

translate some of it by hand to conform to our own structures. Then, when Lotus opened an operation in Puerto Rico and made a series of acquisitions, the situation got even more complex.

Creating the new database gave us an opportunity to eliminate these inconsistencies and keep information for the entire company in one central location.

The new database gets most of its numbers straight from other accounting systems. It structures the data differently, however, so we can generate financial reports automatically.

The database's fundamental building block is the cost center, a typical example of which might be the manager and six technicians who make up the quality assurance group for one of the company's software packages. Each cost center — and Lotus currently has about 400 — is listed separately rather than as part of a department or division.

Why bother with that level of detail? Because that's what gives the system its flexibility. If the CEO wants to see figures on the cost of hiring by product line, for instance, we can produce a report immediately because the expense data is broken down into such specific detail. If he also wants the figures by geographical region, that report is just as easy to produce.

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West Coast. It would take a day, at least. Then, if he asked how much we spent a year ago, we'd have to repeat the entire process, and it would take just as long again. Now we can get the answer immediately, with no additional expense.

Questions like "What was the cost of sales for Product X?" used to be virtually impossible to answer because we didn't allocate costs such as scrap, distribution and obsolescence to individual products. Now, with the increased level of detail the new database stores, we can analyze gross margins for each product for the first time.

Don't forget the budget

The new system was also adaptable to the financial planning department's other main responsibility: preparing the annual budget and periodic forecasts. In this task, we have to consolidate models put together by top management with projections made by individual cost center managers—a process that often takes several tries to get a fit. It has always been an enormous effort, culminating in our staff's working 10- to 12-hour days through October and November. Last year, though, with the help of the new financial planning system, things were different.

We used to give cost center managers blank forms to fill in, which meant they had to dig through their own records for historical cost information, such as their advertising or outside services costs. Last year, instead of blank forms, we sent managers electronic mail transmissions containing their individual cost data, which we had put together from past costs and current trends using the new planning system database. They could then load this information onto their own PCs, eliminating both keying errors and the need to dig out their own records.

We were also able to reduce the amount of information we asked for. Managers used to be required to forecast costs in monthly increments. In 1987, we asked only for quarterly forecasts and let the computer interpolate the monthly figures.

When managers completed their forecasts, they sent the data electronically to the Vaxcluster, which consolidated it and loaded it directly onto our PCs. As a result, doing the 1988 budget took considerably less manpower than budgets had in the past, and it was easier. Now that we've made the transition, it should be even simpler in the future.

And the budget is also more accurate. Before we began using the minicomputer for financial planning, we did number crunching on several different PCs, which sometimes led to discrepancies. It was also difficult to make sure that changes to one part of the plan were reflected everywhere else. Many of our long hours were actually spent tracking down these problems—time we now have the luxury to spend on additional analysis.

Better analysis

And that leads to the most striking result of the changeover: the new level of analysis we're now able to perform. This year, we'll be able to compare the budget with actual costs in a more meaningful way than was possible before, since we'll be able to recast our figures to reflect reorganizations.

We'll also be able to look at details with far more flexibility—for example, we can look at a single expense item for the en-

WITH THE new system, Lotus is now better able to provide up-to-the-minute financial information to members of top management—when they want it and how they want it.

tire company or at a group of items within one division. And since for the past few years we have ended up completely redoing the budget for the last two quarters, we now have a better way to complete that task.

The new financial planning software does require additional staff to keep it operating. Last year, we had a consultant from Research & Planning develop the programs. On a permanent basis, we're

bringing on two people: one with a finance background to be the administrator and one with a systems background to keep the database and other software up to date.

However, future manpower savings should more than compensate for these additions. With the system in place, our department should be able to accommodate considerable company growth without having to add any more financial plan-

ning staff members.

Why has the new financial planning system been so successful? First, Lotus is a technology company with computer-literate managers. There were many PCs already installed throughout the company, which we were able to leverage as a resource for our project. In addition, the company has worldwide, compatible electronic mail capability, which we used to eliminate keying data by hand. And, finally, the company had the resources that gave us the elbow room to try new solutions.

With the new system, we are now better able to provide up-to-the-minute financial information to members of top management—when they want it and how they want it. ■

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FROM PAGE 1

Yet, by any definition, the PDT was a PC. It coupled a computer terminal with built-in intelligence to a CRT screen and keyboard. It operated independently of a minicomputer or mainframe. Bricklin decided that this computer would be the right one on which to build his electronic spreadsheet. He contacted the local DEC sales representative, who gave him product literature

ing new ideas. The PDT that Knowles was trying to develop was talked to death, according to Gordon Bell, then DEC's chief engineer. The product-line managers, who all had their own versions of PCs brewing, covered that product space and wouldn't let Knowles sell. "We spent countless hours deciding who could sell and get credit for it," Bell says. "Ken tried to get consensus in a world where that wasn't possible. It required a painful decision."

The product-line teams that were well-handled, like the terminals group, engineered their own machines. Others contracted with Bell's central engineering to build them. Bell was pulled by the situation. He felt that his group was being forced to "act like whores," building anything anybody wanted as long as they paid for it. He sent a memo to Olsen, listing the various conflicting machines in development. He stressed the negative results of engineering being at the beck and call of the product lines. To Bell, the situation was a surefire disaster. He proposed a "golden rule" whereby engineering would have as much input to a computer as the product line.

Olsen responded swiftly. He sent a memo to the Group Vice Presidents committee. The committee's myriad management groups, saying: "I have long been dismayed as to why so many of our product-line products have been poor, and why it has been so hard to pin down responsibility for them. I think I now understand the problem, and I'll leave it with you and your committee to, with all haste, find the solution."

Despite Olsen's call for a solution, the problem didn't get resolved. And the PC itself was the main reason why. The enormous potential of these low-priced machines dazzled DEC's young engineers. It was a matter of corporate pride to them that DEC be on the leading edge of this new wave. Didn't DEC, after all, pioneer the concept of interactive computing, the very basis for PCs? Wouldn't a desktop machine for the individual be the culmination of Olsen's dream?

The answer, as the 1980s began, seemed to be a definitive "no." Throughout the '70s, Olsen insisted that personal computing was a concept that had no basis in need or reality. To one proposal to build a PC-like device that came before the Operations Committee in 1974, Olsen responded, "Why would anyone need a computer of their own?"

Olsen seemed to be caught on the terms. In his mind, a PC equaled a home computer. In the business market, DEC already offered power to the desktop with its VT100 terminals hooked into PDP-11s and VAXs.

Olsen's stubborn view — "The personal computer will fall flat on its face in business" — was according to Risa and Trout's *Marketing Warfare*, "perhaps the biggest misjudgment in American business history since Henry Ford's failure to block General Motors Corp.'s high-end flank. Ken Olsen is a computer genius, but even a genius can be wrong. As Fiorella LaGuardia once said, 'I don't make many mistakes, but when I make one, it's a beast.'"

Olsen's views on PCs changed abruptly in 1980. Bell presents the catalyst of this change as an interview with a young female reporter from *Business Week*. She came armed with inside information about DEC's low-end efforts and questioned Olsen intensely about the company's lack of progress. "It challenged his manhood," says Bell. "Suddenly, we had to win in PCs."

Others believe that Olsen hesitated because he was seeking a champion for the PC, someone he could count on to make it happen his way. That person just didn't emerge. So Olsen took on the task himself.

"Once he made the switch and then we were going to do it, then [to Ken] nobody could beat us," observes Ted Johnson, then head of sales. Olsen would later say that he was swayed into making "commodity computers" by the critics and DEC executives. Whatever the source of his motivation, he suddenly talked constantly about products a common person could use, easy enough for secretaries or even a

gy. And he picked a young engineer named Avram Miller to do it.

Miller was called before DEC's operations committee, and he made his pitch. It was actually Olsen's vision, so he knew he was carrying a great deal of leverage. What he proposed eventually became the DEC Professional PC. The committee approved Miller and his plan. But he sensed even as he was leaving the room that most of the people in there thought he would fail and that perhaps a few hoped he would.

Miller immediately dubbed the project "K.O." In memos it stood for Knock Out or Kick Off. But Miller's intention was clear: He wanted everyone to know that this was Ken Olsen's project. And indeed it was. With a budget of \$20 million, an unheard-of sum for a low-end project, Miller carried carte blanche at DEC. Bell sent out a memo on Aug. 28, 1980, detailing the proposed project and its implications.

"Ken would like to do this project in nine months," Bell wrote. "We will need maximum support from each group." Bell called the machine "an applications terminal and small system." He never used the words "personal computer." On the list of people involved, he noted that Avram Miller was driving the overall project, and the packaging architect was Ken Olsen.

Three-headed monster

In August 1981, IBM introduced its Personal Computer to the world. Philby "Doc" Estridge had convinced IBM's hierarchy to let him go to Boca Raton, Fla., and quickly build a PC to hold off Apple and the other contenders threatening to swallow this new market. IBM couldn't allow another market takeover to occur as it had in the mid-1960s when DEC quietly created — and then went on to dominate — the minicomputer business.

Upon its introduction, Miller immediately bought an IBM PC so he could examine firsthand what he was competing against. He took it into his office and called Ken to come and take a look. Olsen was excited. This was the first IBM PC brought into DEC. Together, with screwdrivers, they took the competition apart.



DEC's advertisement for the PDP-11

After seeing the inside of IBM's computer, Olsen looked at Miller and laughed, "If you ever built me something like this, you wouldn't be here anymore." Evaluating the machine as an engineer, Olsen saw junk — the inelegant engineering of a quickly constructed machine. If this was the best

Behind the story

In 1980, Ken Olsen was approached by one of DEC's most unlikely customers, Apple.

Michael Scott, Apple's president at the time, visited Olsen to discuss whether Apple should order more PDP-11s or switch to the VAX for billing and order entry. The meeting was cordial, but Olsen couldn't hide his feeling that Apple was going to fail as a personal computer supplier.

Scott ordered a second PDP-11, which Apple needed immediately to process orders because the first one was running out of capacity. But months went by and the machine didn't arrive in Cupertino.

Desperate to get some action from DEC, Scott sent Olsen a 6-foot-high white cross with a red stripe and a person-in-peace ribbon striped across the front. The accompanying note from Scott said: "This is what I think of DEC's delivery commitments." Apple's message was: "You are kidding us with this endless delay."

A PDP-11 was on a plane the next day with two DEC technicians on board to install it. But the machine flew out of the Mill unstated. When turned on in Apple's computer room, the PDP-11 caught fire. Eventually, the machine was set right, and Apple remained a DEC customer.

Out of the episode, a legend emerged. It was Apple's brass founder, Steve Jobs, not Scott, who visited Olsen's Mill office, the story went. He put his boots up on Olsen's desk and told Ken that he was going to blow DEC out of the water in PCs. He supposedly followed this arrogant display with a black funeral wreath sent to mock DEC's performance in PCs.

Despite this colorful legend, Olsen and Jobs were two men representing widely different generations and computing philosophies — never met at the Mill.

GLENN RIFKIN
and GEORGE HARRAR

IBM could offer, he thought, DEC would sweep the market.

Olsen was misjudging how and why PCs would be bought. His reaction sprang from a core of his belief about how computers should be built and used. It was fundamentally not within his psyche to accept something less than top quality. There was no point in creating a machine if you didn't make it the best possible way, with care and insight and elegance.

Olsen's conviction flowed down through DEC to every layer of the organization. It was at the heart of "do the right thing" — which was a founding tenet of DEC. Every employee understood this drive for perfection if they understood DEC at all.

But Olsen didn't understand the crucial part software would play in PCs. In his view, the most important thing a computer company could deliver was well-engineered hardware. He paid so little attention to software that some inside DEC said that he expected it to come from heaven.

Early on in the KO project's life, Miller met with Olsen frequently, often spending half-days discussing design and direction of the new machine with him. Miller began to understand the essence of Olsen behind the ambiguities. "When you were with Ken, you knew you were with somebody," Miller says. "He has this uncanny way of getting people to really want to do what he wants to make him happy."

Olsen talked quietly, but mostly he listened to Miller. Miller often walked away not knowing what Olsen was about, but in some of his offhand comments and parables, "He would have been much more effective if

anybody could have figured out what he wanted," Miller says. "I'm not sure he knew what he wanted."

In fact, Olsen very definitely knew what he wanted in the design of the KO. The clunky, uninspired boxes other PC-makers were turning out would never fly at DEC. Olsen foresaw sleek, stylized components that would enhance, rather than detract from, a work environment.

While Miller assembled his core team, Olsen dove into designing the monitor. He pushed for a wedge shape, which was, from an industrial design standpoint, a breakthrough. Packaging the necessary circuitry into the small, odd-shaped device was difficult. The quest was predicated on the belief that the monitor



Don Bricklin

and keyboard should complement the desk top rather than conflict with it.

Olsen questioned his designer closely: Should there be a handle on the bottom? How would the machine sit on the desk? How could glare on the screen be minimized? He frequently used the word "elegant" to describe what he was after.

Olsen argued that a light filter should be built over the screen. The designers said that a filter was not susceptible to fingerprints. Against their recommendations, Olsen specified that filters should be included. And he advised that a spray can of window cleaner be shipped with each system. "They can wipe away the fingerprints, but they can't wipe away the glare," he said. And so, DEC shipped window cleaner with each personal computer.

Mixed blessing

Olsen's involvement in the project was a mixed blessing for Miller. The stamp of approval afforded him more freedom and influence than someone so new to the company — he joined DEC in 1979 — would ever have achieved so quickly. But it also created agonizing delays and costly retrofits caused by Olsen's unbending views on packaging.

Olsen rarely stated what he did or did not want done. Miller found out that Olsen was displeased with the initial monitor design through engineer Dick Gonzales, who was prototyping a different one. Miller had already spent months and hundreds of thousands of dollars on the first monitor, and this change of direction upset him. But he also had a realist. "I knew I was going to end up building his monitor," Miller says.

Despite his mandate, Miller ran into resistance from various quarters. There was no consensus on how the low end should be structured: organizationally or strategically. Even though Miller was operating with Operations Committee approval, the low end remained volatile — unexplored territory in DEC's convoluted matrix organization. Unlike the existing product lines, the KO project was an illegitimate child, which had sprung up quickly, without roots in any other machine and with an enormous amount of funding — all ingredients for attracting envy and jealousy in DEC's structure.

Miller could see that getting consensus on how to proceed would be impossible. There were too many competing voices advising how sophisticated the machine should be, what ports it should have, how it should look, how it should be sold. So he and his fledgling group set their own course. At DEC, where open debate was presumed, Miller committed heresy.

DEC now controlled 38% of the minicomputer business; it would soon own an equal amount of the personal computer business. Miller predicted, a market that would reach \$5 billion in a few short years. "We have to be No. 1," he told his people. "If you are not No. 1, you can't control things, and that's a fact."

When IBM announced its machine, shock waves rocked DEC.

How could IBM have developed the machine so quickly? Except for the Winchester hard disk drive and the line cord, DEC designed and built every piece of its machine. DEC toiled the sheet metal and plastics for all the components, manufactured the floppy disks, developed the microprocessor. Under the con-

plunge ahead with a higher quality follow-on. But now it was too late for second-guessing. IBM was out to market first; DEC was playing catch-up.

Miller pressed on. KO — renamed CT, for Computer Terminal — would go far beyond the IBM PC's capabilities. IBM's personal computer was designed



"HE WOULD have been much more effective if anybody could have figured out what he wanted. I'm not sure he knew what he wanted."

AVRAM MILLER
On Ken Olsen

straint to "build it here," it was a minor miracle that the machine came to market as fast as it did — in 18 months.

Under Estridge's guidance, IBM sourced out 80% of its PC. IBM bought the operating system, MS-DOS, from a then-small software company in Bellevue, Wash., called Microsoft Corp. IBM turned to a host of third-party suppliers and the Far East for disk drives, monitors and add-in boards. IBM assembled the purchased pieces in nine months — the same timetable Olsen had originally demanded. IBM's PC and DEC's Pro would have hit the market at the same time.

In retrospect, Miller believes that DEC's best strategy would have been to do what IBM did — get a product out quickly, build market acceptance and then

to be just that — personal, a stand-alone device for the individual. DEC was building a machine to network to other DEC systems. It included features that, in hindsight, were years ahead of the competition, such as a high-resolution bit-mapped display and a multitasking operating system. It had a proprietary operating system based on the PDF-11, which allowed it to hook cleanly into networks of DEC computers.

Meanwhile, Olsen found a champion for a smaller version PC that he wanted. In June 1980, a talented and aggressive young Southerner named Barry James Folsom had joined DEC as senior engineering manager of the Terminal Products Group in Marlboro, Mass. In late 1981, Folsom started designing the smaller, less complex machine at

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the request of Olsen and Bell. It was simply an insurance policy against IBM because besides CP/M, an early and popular PC operating system, it could run MS-DOS, the same operating system IBM had chosen for its PC.

While Miller was marshaling the company's resources on the CT project and Folson was designing his "Rainbow" on a shoestring budget, another young DEC engineer, Dick Loveland, began developing the follow-on to the Decmate in the word processing group.

Miller didn't even learn of the two other low-end projects until well after they were launched. He had thought he was carrying the company's banner in the personal computer battle. Suddenly, he had unwanted company in the field.

This situation was not unusual. Olsen often set up competing product-development groups, believing, as he said, that "competition vastly improves a product. History keeps proving that when we allow healthy competition, we get better products."

But to Miller, this competition was not healthy. He and Folson butted heads, arguing over the merits of their approaches and fighting for resources both internally and outside DEC, sometimes going so far as to undermine each other's efforts in the

crucial software development community. The word spread outside DEC to third-party developers — the Miller and Folson groups each were claiming to have the company resources behind them.

Folson and Loveland were riding the coattails of Miller's CT, using all the essential packaging and manufacturing models that he had paid for and sweated over. Olsen still considered the CT DEC's personal computer; the other two were backup machines, "just in case."

Miller complained about sharing resources. "It was a total disaster," he says. "Nothing worse could have happened. We managed to split all the engineering activities, all the third-party software activities, manufacturing, everything. I ended up without any word processing software, for instance. I couldn't go outside to get it, and I couldn't get the DEC group to do it because they were busy doing it for Decmate."

Conversely, Folson found out that he couldn't get Visicalc, by now a best-selling software program, written for the Rainbow because, he believes, Miller told Visicalc that the Rainbow was an underfunded, unsupported machine that would likely not see the light of day.

Even the product's name ran into trou-



Barry James Folson

OLSEN OFTEN set up competing product-development groups, believing, as he said, that "competition vastly improves a product. History keeps proving that when we allow healthy competition, we get better products."

The Operations Committee actually wanted to call Folson's machine CP/M, after its primary operating system. Folson vehemently argued against that name. He called his friend, Bill Gates, the wunderkind chairman of Microsoft, and asked him to speak in behalf of his operating system — MS-DOS.

Gates met with Olsen at the Mill, DEC's Maynard, Mass., headquarters, in late 1981 and convinced him that CP/M had not wrapped up the PC market. MS-DOS, Gates insisted, might well become the industry standard, since IBM was embracing it. Olsen accepted Gates' argument and crossed CP/M off the list of possible names. That move saved DEC the enormous embarrassment of tying its PC to an operating system that would soon be extinct.

By early 1982, time was running short. The new target date to introduce the personal computers was set for May, just in time to make a splashy market entrance at the huge National Computer Conference in June. The development teams for all three computers were working at a crushing pace — seven days a week for months on end. As the announcement ap-

proached, Miller called in a corporate psychiatrist to help his tense group cope with the stress. "I've been here almost 18 full minutes listening to you," the psychiatrist said, "and I'm exhausted."

Andy Knowles, who could see the chaos of the low end that he was responsible for, tried to coordinate the impending introductions of the three new machines. At Saturday meetings, he gathered the principal managers involved to sort out the marketing efforts.

Miller hoped someone like Knowles could stop what seemed to be inevitable. But a meeting with Ken sealed their fate. Olsen called in Miller, Folson and Loveland to discuss the three-headed monster DEC's low-end strategy. He said, "You know, I'd make it easy on everybody if I said just one of these products will come out. But I'm not going to do it, because they do different things, and the market will figure out who is right."

"The market figured out who was right," Miller says, "and it was IBM." ■

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MANAGEMENT

TAKING CHARGE

William R. Brittain

Getting organized

One of the most obvious ways to improve productivity is simply to get organized. There's nothing new about that idea, but even the obvious is often overlooked or put off.

We tend to organize, some people more than others, because there are advantages to it; in business, it often makes a competitive difference. In programming, there is a real, informal system of organization that experienced programmers use to their advantage. By adding some thought and design, we can improve programmer productivity based on this common approach.

In nearly all the minicomputer and mainframe shops I've seen, the technical environment is the last to be given organizational consideration. Programmers aren't organizers, and the people who are supposed to be organizing, such as analysts and managers, are unaware of the real working environment of programmers. It is a world closed to the attention of those who might passionately organize every detail of a policy or business meeting but lack the technical background to understand or care.

Time for a change

The result is a programming environment that is the same as it was 20 years ago — which does not mean it was terrific at that time. Rather, it survived because it gave rise to an informal system of organization.

Continued on page 105

PCs smooth disabled workers' road to MIS

BY JAMES DALY
CW STAFF

The glossy information packet issued by Handisoft, a Philadelphia-based programming firm, breezily describes some of its services: analysis of business problems, the design of software to meet those needs, training seminars and troubleshooting.

But tucked into a nondescript paragraph is a phrase that distinguishes Handisoft from the thousands of other companies trying to make a buck: "a unique team of professional programmers who are physically disabled."

There is no altruistic pitch or be-kind-to-the-handicapped sympathy angle. Except for these few syllables, there is nothing in Handisoft's brochures to indicate that its 20 full- and part-time staffers tote a different set of emotional and physical baggage than most MIS workers. Which is exactly the way

Handisoft likes it.

Over the past five years, machines that talk, listen, teach, communicate and translate have rapidly cleared major workplace hurdles facing the disabled. In a surprising example of reciprocity, a generation of handicapped workers has returned the favor and flocked to the ranks of the information systems world.

The widespread availability of the personal computer almost single-handedly delivered the disabled from the Dark Ages. Suddenly, a person having only the control of an eyepiece or a toe could communicate with virtually anyone with the appropriate equipment attached to a machine.

PCs were easy to use, patient and nonjudgmental, handicapped workers say. They still could not right nature's wrongs, but they suddenly threw open doors that had long been locked.

Continued on page 108

Eyes front, and back

Aetna MIS chief resolves to learn from history

BY JAMES DALY
CW STAFF

While most MIS officers like to envision themselves as always looking toward the future, Bob St. Germain knows it is just as important to check over your shoulder now and again.

"As information systems professionals, we're haunted by our past," says St. Germain, vice-president of information systems operations at Aetna Life & Casualty Co. in Hartford, Conn. "We're known for providing things that are too big, too late and no longer do what needs to be done."

And it's a trap he intends never to fall into. He vows never to perceive himself as the wizard in the glass cage; he's been in the trenches too long.

"We can't exist with blinders," St. Germain says. "We need to keep our eyes open to improve our perspective and learn everything we can about our business. Because, after all, information processing is just a tool to support the business." Serious business talk from a man who, were it not for a few misplaced germs, might be factoring square roots for a living.

Perspective

While working toward a master's degree in mathematics at the University of New Hampshire, St. Germain contracted mononucleosis. During his recuperation, he got married. Suddenly, earning a wage seemed a lot more important than attaining an additional degree.

St. Germain began scanning the want ads in *The Hartford Courant*. An advertisement placed by Aetna that mentioned computers caught his eye. "My idea of computers at the time

PROFILE

Bob St. Germain



Position: Vice-president of information systems operations, Aetna Life & Casualty Co.

Philosophy: "We need to keep our eyes open to improve our perspective and learn everything we can about our business."

was the punch cards that came with the telephone bill, and I thought that sounded neat," he says 17 years later.

Although the career began almost as a fluke, he found it enjoyable. He started as a programmer trainee and scaled the corporate ladder.

Today, St. Germain reigns as Aetna's chief of telecommunications, commanding a budget of \$98 million. At his post at the company's headquarters in downtown Hartford, he is never more than a half-hour's drive from the 480 telecommunications department employees who staff a ring of offices in the nearby towns of Windsor and Middletown.

To maximize efficiency and minimize confusion and overlapping, St. Germain has sliced his department into several divisions. Each has a simple mission.

Continued on page 104

Data View

How does your company approach computing?

Only a small portion of 244 firms surveyed consider themselves exemplary of the leading edge



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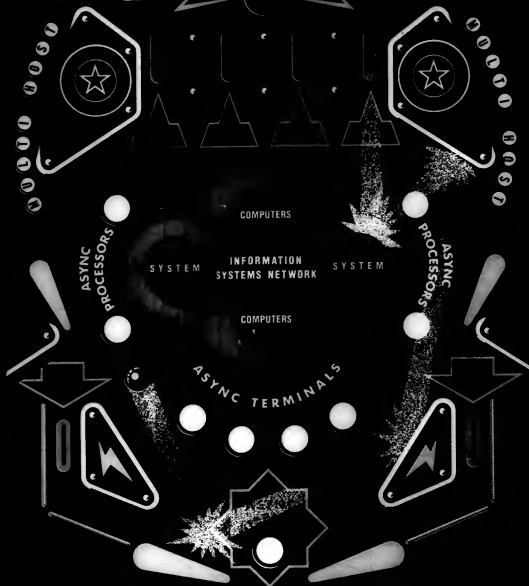
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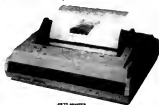
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Eyes front

CONTINUED FROM PAGE 101

"to be regarded as a highly efficient provider of computer and telecom resources to help meet business needs and objectives," he says. "I'm a very hands-on, detail-oriented and personnel-oriented manager. The technology is a tool that the individuals have to manage, have to direct, have to exploit."

St. Germain is also an unusual manager in one sense: He likes it when his people disagree with him.

"I need the staff to provide constructive criticism and an opposing viewpoint," he says. "We've got bright people here, and I don't want them to clam up for fear

they'll be chastised if they disagree."

It was during his rise at Aetna that St. Germain embarked on one of his most educational assignments: the creation of a 121,000 sq.-ft. computer center in Middletown.

"It was a dream project," St. Germain says. "I not only helped design and build it but had the opportunity to run it once it was set up."

The opportunity to get his hands dirty in the design impressed on St. Germain the need for flexibility in his job. And that means using whatever it takes to get the job done.

"We're a committed multivendor shop," he says. But, he adds with a sigh, "that is often not an easy task."

In his technological array you'll spot

"I'D LIKE TO take the technical knowledge I've gained in the job and apply it to other areas of the company. I feel I owe Aetna that."

BOB ST. GERMAIN

IBM systems running alongside Amdahl Corp. equipment running alongside Xerox Corp. machines, and Prime Computer, Inc. boxes sitting next to ones from Digital Equipment Corp. or Data General Corp. His job has also been made tougher

by the fact that attrition has slumped Aetna's MIS staff by nearly 20% during the past few years and the higher-ups hope it can remain lean.

Nevertheless, St. Germain is confident he can rally his remaining forces and launch a technological offensive for Aetna. "Telecom is just getting into its own, and there's been aggressive development and change in that arena," he says.

Plans include exploiting the use of expert systems in claims screening, underwriting and the review of medical records.

Unfortunately, MIS can only contain St. Germain for so long. "I hope this job leads beyond MIS," he says. "I'd like to take the technical knowledge I've gained in the job and apply it to other areas of the company. I feel I owe Aetna that."

MANAGERS ON THE MOVE

Martin Marietta moves Wiltshire into VP slot

Martin Marietta Corp. in Bethesda, Md., recently named senior research executive Raymond S. Wiltshire vice-president of computer-aided productivity.

Wiltshire, who had been executive director of the Oak Ridge National Laboratory at Martin Marietta Energy Systems Inc., will be responsible for coordinating computer-aided productivity initiatives through Martin Marietta and ensuring their compatibility.

Wiltshire joined the organization in 1958. He holds a bachelor's degree in electrical engineering from Ohio State University and a master's degree in business administration from the University of Denver.

Jim Alonso is the new manager of MIS at Dendrite Americas, a Warren, N.J.-based subsidiary of software supplier Dendrite International.

Alonso assumes a newly created post in which he will report to Executive Vice-President Herbert E. Smith.

Alonso had been manager of technical support at LCS Industries, Inc. and spent seven years at Litton Industries, Inc. with management responsibilities in systems and operations. He is a graduate of the New Jersey Institute of Technology.

Alonso announced two promotions within Dendrite Americas' MIS department, naming Joan Hughes and Roy Svendsen as project leaders.

Edward P. Pisula Jr. has been named manager of data processing at Heinz U.S.A., a Pittsburgh-based division of H.J. Heinz Co.

Pisula is responsible for data processing and database operations, computer technical support, systems quality assurance and data control and preparation.

Pisula was previously manager of technical support at the Presbyterian-University Hospital in Pittsburgh; in addition, he held information systems posts at Blue Cross and Blue Shield of Western Pennsylvania and at Allegheny International, Inc.

He majored in accounting at Pennsylvania State University and earned a master's degree in information sciences at the University of Pittsburgh.



Britain

CONTINUED FROM PAGE 101

Experienced programmers develop a working knowledge of useful routines. They use model or skeleton programs. They "steal" pieces of code from another program and modify them to meet their current needs. The technique is common. It makes sense. If the programmers don't have to write it again or think through a problem again, they don't. They keep a catalog in their heads and reuse that code.

I'm not talking about macros or copybooks or standard programmed algorithms, functions, intrinsics or subprograms that must be called. In the design of

IN NEARLY ALL minicomputer and mainframe shops, the technical environment is the last to be given organizational consideration.

the programming environment, these common requirements were recognized.

In reality, there is an informal system that programmers use to be productive. It is most often represented in their knowledge of routines throughout a system, their personal libraries and their ability to outperform less experienced programmers. When organization is applied, that informal system and its resources become shareable. This raises productivity by giving the experience of knowledgeable

programmers to those who are just learning a particular language or system. Even experienced programmers can become more productive and responsive.

Using what's there

The idea is simple, and the system already exists. The idea is to formalize the programmer's informal catalog and references — human or otherwise — into a workbook of modifiable routines. I call mine "pages." Their advantage is that

they are modifiable and already contain the basic logic that is required. In some cases, the advantage applies to the use of standard functions.

An obvious candidate for any programmer's library is the coding required to produce a report, and this should serve as a good example. I have five report pages in my library. When I am working on a program that requires a report, I include the routines in the text at the appropriate place and make any needed quick modifications.

The report pages I use are an initialization routine, a detail-line formatting routine, a print routine with header logic, an end-of-job routine and a storage page containing definitions for two headers and a detail line.

I could have written these as macros with selected parameters, but instead I just stored the code in a library. In this way I have the advantage of having pre-written and stored code — but with greater flexibility. While I am programming, I don't have to consider the details of it, either.

The member name becomes just like a high-level instruction name, but one that I've written and can modify internally. As an aid, I include a library member called "Index" that lists and documents all of the other members. That simple innovation is useful in any case.

In general, I keep storage definitions with the page that uses them and, even in the case of IBM assembler, keep the definitions within the program next to the routine, instead of placing them at the back. It is convenient to see the storage while viewing the code, rather than having to look it up in a cross-reference. It reduces errors and encourages modular programming.

Serendipity

Often, programmers have to code a special or difficult call or routine that requires extensive research. Often, the correct use of some of the required parameters for these routines is discovered by accident, by trial and error or by reference to another program.

If the programmer simply saves it and prepares it for future use, time and errors are saved and the routine becomes available to others as just another part of the repertoire instead of something to avoid.

I have my own conventions for coding the routines and for helping me recall and organize them. It's been very productive. The catalog is based on the informal or manual system of programming.

Good programmers use an approach; however, it is not shareable, it is not formal and it is somewhat inefficient. The average programmer hasn't even thought of it yet. The point is to just get orga-

I believe this approach can provide the basis for an automated programming system that organizes the programming environment regardless of language. The informal systems should have evolved further but didn't. I think the reason is the arbitrary limitation on the length of member names. Eliminating that restriction would open up many possibilities.

Hopefully, whatever productivity improvements are made, the resulting savings in time and effort will be used to purchase more quality time and effort. That is the only way to grow.

Brittain is a senior programmer analyst and team leader at Capital Holding Corp. in Louisville, Ky.

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Plus 

PCs smooth

CONTINUED FROM PAGE 101

This was not always the case. Ten years ago, when computers were simplifying mundane office tasks, they were turning the job market into a living hell for the disabled. Just ask Olga Espinola, a native of Cuba who has been blind since she was a 2-year-old.

"A few years back, I just didn't consider myself competitive, but that's really changed," says Espinola, while nimbly dodging cars and potholes in the concrete jungle of downtown Boston. She stops deftly just before a white Lincoln Continental, oblivious to her red-tinted cane poking into the road, roars past.

Poor technology prior to 1985

"Up until about 1985, we had very poor technology for making the PC accessible to the handicapped. Without that skill, it was very difficult to go for the good jobs," she adds while hurrying to her job as a management trainee in the research and development department of New England Telephone and Telegraph Co.'s technology support group.

Suddenly equipped with the skills to compete, Espinola quickly made a move into a field that recently had seemed to be passing her by.

"Information systems is very alluring for the handicapped," says Jim Vagnoni, chairman of the Association of Rehabilitation Programs in Data Processing. "The work is essentially sedentary, and it's go-

ing to pay enough so it is not a disincentive to go to work. Some quadriplegics must pay as much as \$20,000 a year for special devices and a specially equipped van just to arrive in the office each morning."

At the University of Pennsylvania Center for Information Resources (CIR), the staff believes the disabled are not only



Espinola's system reads printed material out loud.

employable but in great demand. Through the CIR's various MIS training programs, students are equipped with a battery of technological computer knowledge and then offered three-month internships at local businesses.

In a seller's employment market, both national and local businesses seem eager to scoop up the abilities offered by CIR alumni. Since its inception in 1976, the center has placed more than 90% of its graduates in full-time data processing jobs, with some starting salaries hitting \$27,000.

After graduation, many handicapped

workers find a receptive niche. A Du Pont Co. survey of 1,452 handicapped employees found that they demanded no special compensation and often sported glowing safety and attendance records. The survey also discovered that handicapped workers often made only one request: to be treated as regular employees.

Employers agreed. "They are not handicapped programs, they are good programs that happen to be handicapped," says Harvey Karlin, manager of FDP training at First Pennsylvania Bank. In the highly competitive computer business, some companies have discovered a virtually untapped mother lode of qualified workers and are not only hiring the handicapped, but are actively seeking them out.

The Arlington, Va.-based Adapto Foundation, an arm of the software and computer services industry trade association, now links computer software and services firms in the Los Angeles area with disabled workers seeking jobs.

Employers are also abandoning the financial prejudice that had once hindered employing the handicapped. "A big question used to be, 'Am I simply hiring a blind person or am I hiring a blind person plus the thousands of dollars in equipment they'll need to work in our office?'" Espinola says.

In many cases, state and local rehabilitation agencies now level the playing field by offering to pay for any unusual equipment required. Even special equipment can be relatively inexpensive — a PC equipped with speech hardware and software often costs less than \$5,000 — and tax breaks are often available. But these considerations are often unnecessary, says Handsoft President John Connolly, adding that adapting work-related equipment for disabled workers is often neither difficult nor expensive. "Accommodations can be as easy as raising a desk slightly so a wheelchair can fit under-

neath it," Connolly says.

Even those whose disabilities bind them to the home are finding inroads into the information systems world. Tapping into an office market is now as simple as looking up to a modem.

With the technological strides have also come profits. Providing machines to the handicapped is a \$50-million-a-year market in the U.S., says James Bliss, whose Telesensory Systems firm in Palo Alto, Calif., provides equipment to the blind and visually impaired. "The market has quite simply exploded," Bliss says; his company was a lone eagle when it began in 1971 but now shares its niche with dozens of others.

An array of speech synthesizers, braille computer printers, tactile dot-matrix type on a screen up to 16 times normal size, voice-recognition software, keyboard emulators and equipment that can be activated by the blink of an eye or the wrinkle of an eyebrow are available for nearly any type of disability.

Releasing potential

Machines that assist the handicapped are not just making waves among the myriad workers handling everyday chores at thousands of offices across the country. They have also helped release the potential of what may be one of the greatest minds of our time.

In England, 46-year-old scientist Stephen Hawking sits twisted in a wheelchair, unable to speak. For the past several years, Hawking has been paralyzed by amyotrophic lateral sclerosis, more commonly known as Lou Gehrig's disease.

Hawking, a professor of mathematics at Cambridge University, is the author of the best-selling survey of modern cosmology, *A Brief History of Time*, in which he explores the Grand Unification theory — a theory linking relativity and quantum mechanics that Einstein sought for years in vain to prove.

But Hawking would not have been able to offer a word from the vast creative fields of his mind were it not for a 12-pound computer that processes close to 2,600 words at a time. He communicates by a barely perceptible twitch of his finger, generating one computer-synthesized word every six seconds and taking an entire day to compose a 10-page lecture.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Bohdan O.
Szuprowicz

AI hits the real world



The benefit of expert systems deployed by major corporations was a major topic discussed at the American Association of Artificial Intelligence (AAAI) '88 conference this past August in St. Paul, Minn.

A recent study conducted by Edward Feigenbaum of Stanford University found that in mid-1988, about 2,000 expert systems were put into production. Of these, 1,500 are deployed in the U.S., 250 in Japan and another 250 in Europe.

Thus, the bulk of expert systems activity is currently concentrated in research and development stages. Expert systems currently used in businesses represent only about 2% of the estimated expert system development shells that have been sold worldwide by more than 100 different vendors.

However, the advent of low-cost hardware platforms based on high-speed Intel 80386 microchips guarantees an explosion in development and deployment of expert systems during the 1990s.

Noses to the grindstone

Several supercomputer start-ups, such as Active Memory Technology, Cogent Research, International Parallel Machines, Key Computer Laboratories, Prisma, Privac and Topologia, are at work developing very high-performance parallel-processing workstations.

At the AAAI '88, several presentations described users' initial attempts to measure and classify the benefits resulting from deployment of production expert systems in various applications. These included a wide spectrum of applications ranging from extremely simple, form-filling systems to the most complex real-time scheduling implementations.

One of the greatest findings reported by the researchers who conducted the Feigenbaum study was the universal spread of professional and semiprofessional work activities whenever

Continued on page 110

Young-minded Krowe moves on

Retires after 28 years with IBM, assumes high-level position at Texaco

BY CLINTON WILDER
CW STAFF

ARMONK, N.Y. — IBM Executive Vice-President Allen J. Krowe took a highly unusual step last week by retiring from IBM for a new career in another industry.

Krowe, formerly IBM's top financial executive, was named senior vice-president and chief financial officer of beleaguered petroleum giant Texaco, Inc. The 56-year-old executive officially retired this past Saturday after 28 years of working at IBM.

While the computer industry



Texaco's Krowe

is full of ex-IBMers, few of them have reached the elite level that Krowe reached, who was one of five members of the IBM Man-

agement Committee reporting directly to Chairman John F. Akers. "I can't remember anyone at that level going to another company and certainly not to another industry," said Jack Hart, a vice-president at Framingham, Mass.-based market research firm International Data Corp. and a veteran of IBM.

In an interview, Krowe said his move was partly motivated by IBM's policy of mandatory retirement at age 60. "I feel young and feel that I can make vital contributions until the middle of the next decade," he said. But he defended the retirement policy, saying it keeps IBM "charged up

per share, a \$3 per share premium over Telson's latest offer. The announcement came immediately after an exchange of Telson-MSI counterattacks that added charges of securities law breaches and the spreading of false and misleading information to the patent disputes already pending between the two companies.

Akron, Ohio-based Telson is the hand-held computing market leader, and MSI, based here, is its biggest competitor.

Symbol Technologies, which currently owns about 4.5% of MSI's common stock, is an expert in bar-code laser scanning.

Legal unpleasantness notwithstanding, Telson neared the week's end still determined to

Continued on page 113

and moving." Krowe was once considered a potential candidate for the IBM presidency by company observers, but his last two job changes moved him away from that path, analysts said.

His move from the top IBM financial job to lead development and manufacturing for several product lines in 1986 indicated IBM's dissatisfaction with his optimistic financial growth forecasts that IBM failed to meet, said Bob Djurdjevic, president of Ausser Research in Phoenix.

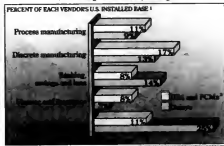
In IBM's major U.S. management reshuffling that occurred last January, Krowe was named to the new position of executive vice-president with direct responsibility for real estate and construction as well as review responsibility for mid-range and

Continued on page 113

Data View

Unisys vs. IBM: Where the sites are

A full quarter of Unisys installations are government sites; IBM's strength lies in manufacturing



SOURCE: COMPUTER INTELLIGENCE, INC., CW STAFF

MSI blocks Telxon with other firm

BY NELL MARGOLIS
CW STAFF

COSTA MESA, Calif. — MSI Data Corp. said "tough tender" to archival and would be acquirer Telxon Corp. last week and entered into a definitive merger agreement with Symbol Technologies, Inc.

Under the contract, the Bohemia, N.Y.-based "white knight" will acquire MSI at \$23

More Infont jobs cut; manufacturing hit

BY AMY CORTESE
CW STAFF

The ax continues to swing at Memotec Data, Inc.'s Infont subsidiary in Andover, Mass.

Since the abrupt firing of President Nick Papantonis and other top executives last month, 45 more employees in engineering, customer support, manufacturing and finance have been let go.

So far, an estimated 60 of Infont's 200 employees have been dismissed, according to one who was let go.

According to Andre Deslauriers, a company spokeswoman, the layoffs have involved mostly management in an attempt to avoid duplication of positions.

But manufacturing has also suffered heavy cuts, according to sources. Deslauriers confirmed

that "30-odd" employees have been laid off within manufacturing.

This raises uncertainties, since Memotec has virtually no manufacturing facilities of its own. Deslauriers revealed that the layoffs were intended to make manufacturing more cost-effective and that operations in Andover would be run more like those in the firm's Montreal facility.

The Montreal site has a smaller manufacturing operation, consisting of only 30 or so employees. Most manufacturing is farmed out, and only assembly and some customization are actually performed on site.

More moves ahead?

Memotec recently acquired shares of Infonet Systems, Inc., a Cherry Hill, N.J.-based seller of

statistical multiplexers and a reseller of Infont modems. There has been speculation by some industry observers that Memotec might acquire Infonet and combine the operations of the Andover subsidiary.

At a Wednesday press conference held at the Telecomm Association in San Diego, Memotec officials stated that Memotec will continue its strategy of growth by acquisition.

At a Wednesday press conference held at the Telecomm Association in San Diego, Memotec officials stated that Memotec will continue its strategy of growth by acquisition.

The Infont layoffs apparently did not result from red ink at Infont. Deslauriers confirmed that Infont is profitable. The firm also recently signed a potentially lucrative agreement with BellSouth Advanced Systems under which the telephone company would market Infont's modems and network management products.

The Memotec parent company, also based in Montreal, decided recently to merge the Memotec operating unit with the Infont subsidiary. The two data communications divisions will operate as a single business unit called Memotec Infont.

The other divisions of the Memotec parent are telecommunications services, which is the Telelogix subsidiary; a systems integration division providing turnkey solutions to insurance firms and municipal governments; and a consulting division.

Szaprowicz

CONTINUED FROM PAGE 109

production experiments are deployed.

These findings reveal that one order of magnitude (10x) speedup is common, and two orders of magnitude (100x) is possible and reached occasionally when expert systems are deployed to automate various decision making processes.

The study suggests that expert systems in technical marketing and engineering exhibit the highest speedup factors. These range from 300x to 360x in the cases of system configurators deployed by leading hardware firms such as DEC and IBM.

It is not surprise, therefore, that practically all other hardware vendors, as well as many data communications and networking suppliers, are developing or fielding expert system configurators to stay competitive in the market.

Airline scheduling and investment portfolio optimization, such as systems developed by All Nippon Airways and Sawwa Bank in Japan, showed the next highest speedup factors of about 80x. A continuous-strip steel plant scheduling expert system implemented by NKK Steel, also in Japan, is credited with a speedup factor of 25x. At Northrop in the U.S., an expert system coupled with a manufacturing resource planning activity increased operation by 16x to 18x. The study also revealed that in mid-

1988, diagnostic expert systems accounted for more than 50% of all production expert systems deployed by major corporations that were included in the survey sample. The second most common usage was classified as knowledge-delivery applications — defined as selection of and advice on products and procedures in context of specific situations. Expert systems for scheduling, however, are now seen as the fastest upcoming application in manufacturing.

DEC has reportedly realized savings of between \$70 million and \$100 million annually through deployment of embedded expert systems in its operations.

Szaprowicz is managing consultant of the expert systems practice at Computer Task Group, Inc.

IN BRIEF

Alpha annexes Doolz

Alpha Microsystems announced the intention to acquire privately held Doolz Networks, Inc. in Irvine, Calif., for an undisclosed amount. Alpha Microsystems' option to acquire, which expires Oct. 7, is subject to the approval of the Alpha board. Doolz, founded in 1979, is a vendor of data communications equipment for multi-vendor environments. Doolz employs about 150 people. Separately, Alpha Microsystems announced a profit of \$605,000, or 19 cents per share, on revenue of \$12.7 million for the quarter ended Aug. 28.

Relational Tech's COO now CEO too

Alameda, Calif.-based Relational Technology, Inc.'s President and Chief Operating Officer Paul Newton entered the new month with a third title, replacing company co-founder and Chairman Gary Mergenthaler as chief executive officer of the booming database vendor. Under Newton's stewardship, the maker of the Ingres relational database management system recently finished a year that saw profits triple and revenue rise nearly 90%.

Blue-blooded VP tackles Bull

Once again proving itself a connoisseur of pedigree, Honeywell Bull, Inc. announced a newly created position — vice-president of general products, product line management — and the appointment of IBM Unix man David Wurthoff to fill it. Wurthoff, a 23-year IBM veteran, most recently headed up AIX Systems for the company, simultaneously serving as a leading IBM liaison to the Open Software Foundation. At the soon-to-be Massachusetts-based Honeywell Bull, he will shoulder worldwide responsibility for bridging engineering, manufacturing, marketing and business planning for peripherals, cross-systems software and — surprise, surprise, surprise — Unix.

Comdisco creates CAE division

The world's largest independent computer leasing firm has gone techies. Comdisco, Inc. announced the creation of a subsidiary, Comdisco Systems, Inc., that will develop and sell computer-aided engineering (CAE) software used in the design of digital signal processors and communications systems. Much of the technology will come from CAE software firm Star, Inc. in Lawrence, Kan., which Comdisco acquired to be part of Comdisco Systems.

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COMPUTERWORLD

EXECUTIVE CORNER

U.S. lessor gets gobbled

Elsewhere in the leasing business, the pace of consolidation continued unabated. Atlantic Computer Systems, Inc., the U.S. subsidiary of UK-based Atlantic Computers PLC, acquired Datalease Corp. in Westport, Conn., for an undisclosed amount. Atlantic has stated the intention of boosting its U.S. business by acquiring smaller U.S. firms. Datalease, with annual revenue of \$25 million and a lease portfolio of \$65 million, specializes in leasing IBM and other mid-range computers in the New York metropolitan area.

Weyerhaeuser shuffles execs

Weyerhaeuser Information Systems announced the appointment of Susan M. Merrerreau to the top position of vice-president and general manager. She replaces Frank K. Guthrie, who became vice-president of Weyerhaeuser Paper Co.'s Longview, Wash., plant. Merrerreau has been director of telecommunications at Weyerhaeuser Co., the parent company, since 1982.

Zenith raider swaps court

The battle for control of Zenith Electronics Corp. continued as corporate raider Brookhurst Partners Limited Partnership moved its lawsuit against Zenith from federal to state court in Delaware. Brookhurst's suit in federal court had been dismissed on jurisdictional grounds. Brookhurst reportedly wants to acquire Zenith to sell its unprofitable consumer electronics business and control Zenith Data Systems, a profitable division.

Sign of the times

The Transportation Data Coordinating Committee officially changed its name to TDCC: Electronic Data Interchange Association. The Washington, D.C.-based group said it changed its 20-year-old moniker to reflect its representation of nontransportation companies involved with EDI.

Errico adds Price Waterhouse to team

Computer-aided software engineering market newcomer Errico Technologies, Inc., which signed on software player Boole & Babbage, Inc. to handle worldwide distribution for its recently released AMS/Team product line, closed out the month of September with another prime contract. Big Eight accounting firm Price Waterhouse will be providing training, installation and implementation services for the Errico line, which among other features claims reverse-engineering capability.

Ashton-Tate Corp. announced the promotion of two members of the company's management team. Peter Boot, 46, has been promoted to vice-president of the international division, and Robert Kimball, 32, assumes the post of director of product management for decision support products.

Multiflow Computer, Inc. has appointed Robert Nix as vice-president of product marketing. Chani Pangali as corporate director of technical services and support and Michael Saylor as director of operations.

Nix was director of operating system

development at Multiflow before being promoted to his new position. Pangali most recently was director of applications software, benchmarking and strategic planning at Cytrome in Milpitas, Calif. Saylor joins Multiflow from Prime Computer, Inc., where he served in a number of senior field sales management positions of increasing responsibility.

Harry B. DeMaio, after a 30-year career at IBM, was named national manager of information protection services in the management consulting group at Deloitte Haskins & Sells.

DeMaio's most recent position at IBM

was corporate director of data security programs.

Borland International announced that Stephen J. Kahn has joined the company as vice-president of marketing. Borland also announced the addition of Stephen M. Green as director of business development.

Kahn, 39 — no relation to Borland Chairman, President and Chief Executive Officer Philippe Kahn — comes to the company after serving as a director of special projects for Lotus Development Corp. Prior to joining Borland, Green, 35, was with Microsoft Corp., where he was manager, Southwest region for the OEM Group and then manager, developer relations group for systems software.

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MSI blocks

FROM PAGE 109

drag MSI kicking and screaming down the aisle, and with sweetened terms: hours after MSI's coy announcement of negotiations with a white knight was released on the news wire, Telxon upped its offer to \$20. Then came Symbol.

Will the Symbol announcement turn back Telxon? "I guess at \$17 or even \$20 a share, we don't look very attractive right now," a Telxon spokeswoman said. "Whether we will up our offer and enter a bidding war is something we just don't yet."

Keeping score

Between the courtship and the court action, the MSI-Telxon relationship is beginning to require a scorecard to keep track of everything:

- In 1985, Telxon, which had then outstripped MSI in the handheld computer market, sued MSI in Ohio federal court, charging theft of confidential information. The suit, in which Telxon asks for \$100 million in punitive damages, is scheduled for trial next month.

- MSI fired back; its lawsuit, brought in California district court, charged Telxon with infringement of certain patents for

bar-code readers that can attach to mainframes.

- Last month, Telxon made an unsolicited tender offer to acquire MSI for \$17 per share (CW, Sept. 19). MSI President Charles S. Strauch fired off a letter to the company's stockholders urging them not to jump at the Telxon offer.

Last week, the stakes escalated on all counts. First, MSI filed a counterclaim against Telxon in federal court in Delaware.

Among the list of allegations was the charge that Telxon's pursuit of MSI — motivated, according to Telxon, by the desire to build an invincible entry into the bar-code-reader market — was actually a ploy intended to shield the larger company from possible damage exposure in case

of a loss on the patent issue while simultaneously gaining free access to the very MSI technology that MSI says Telxon has taken.

"Their allegations are totally unfounded," Telxon's Vestch said. "We will fight vigorously." Early last week, Telxon filed its counter to the counterclaim.

Meanwhile, in a letter addressed to MSI's board of directors, Telxon President Raymond Mayo expressed disappointment "that you have refused to respond to my numerous requests to negotiate and that you have continued to deny us access to the same information you have been providing to third parties considering an acquisition of MSI."

Mayo also chided the MSI board for giving its consistently spurned suitor a

mere two hours' notice of an MSI board meeting.

"This is no way to run a fair auction with a level playing field," he wrote.

Even if Telxon prevails in its takeover attempt, some observers speculated that relationships between the companies could prohibit the successful formation of a single superplayer in the handheld computer market, locking the firms instead into a state of uneasy deadlock.

Symbol, meanwhile, has hedged its bets: Under the terms of its agreement with MSI, Symbol will get \$6 million "if the merger is not consummated under certain circumstances generally involving alternative acquisition transactions involving MSI," plus possible expense reimbursement.

Young-minded

FROM PAGE 109

personal computers and communications products.

"He and Kaspar Cassani got fancier titles but less responsibility," Djurdjevic said.

Krowe's move to Texaco is not as far removed from IBM as it would appear. Not only is the oil giant based in nearby White Plains, N.Y., but its board includes former IBM Chairman Frank T. Cary and current IBM board member Thomas

I FEEL YOUNG and feel that I can make vital contributions until the middle of the next decade."

ALLEN J. KROWE
FORMER IBM EXECUTIVE

Murphy, chairman of Capital Cities/ABC, Inc.

Krowe said it was a "bittersweet choice" to leave IBM, which he said was "populated by the finest group of human beings imaginable. This [Texaco] opportunity came along 16 to 24 months sooner than I would have liked, but opportunities match their own schedules — not mine," he said.

In other executive moves last week, IBM promoted Systems Products Division President Edward J. Kioury to corporate vice-president and named two new members to the board of directors. The new directors are Edgar S. Woodard, president, chief executive officer and chairman-elect of Du Pont Co., and John Brooks Slaughter, president of Occidental College in Los Angeles.

Also last week, IBM announced its third stock buyback plan in as many years. The firm will purchase close to \$2 billion of its shares.



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COMPUTER CAREERS

AS/400 demands new expertise

IBM's mid-range system shifts skill spotlight to RPG III, perhaps Cobol

BY ALAN RADDING
SPECIAL TO CF



The introduction of the IBM Application System/400 has extended career paths for some programmers who work in the IBM System/36 and 38 environments, just as it has established the upgrade path for users. But the warm reception given the new product line will not necessarily boost demand for IBM mid-range programmers.

Industry analysts see the initial conversion to the AS/400 taking place during the next two years. At this early stage, the following trends are already clear:

- Many shops plan to migrate to the AS/400 without any additional programming help; demand for System/36 and 38 programmers remains strong, however.

- RPG II programmers will either have to upgrade their skills or remain in a contracting System/36; RPG III programmers are positioned to move ahead but may also want to broaden their skills.

- AS/400 shops might require less support than System/36 or 38 shops; initially, the most dynamic opportunities will be with software and consulting firms.

In a nationwide survey by Focus Research Systems, Inc., of West Hartford, Conn., 70% of the AS/400 sites said they plan to port all their existing System/36 and 38 applications to the new system. Another 6% plan to port three-quarters of their existing applications.

Furthermore, most of those data processing managers expect the conversion to be completed in less than 30 days using their existing programming staff. Although the DP managers are skeptical that the migration will be as easy as IBM has promised, they clearly are not planning to staff up for a major software conversion effort.

Texasans need not apply

In Texas, AS/400 buyers use the RPG III programmers they already have on staff for the conversion, says Pam Holden, managing director of Source EDP in Houston. "Most shops are just upgrading, so there isn't the demand for new people," Holden says.

But that approach doesn't meet the demand for RPG II and RPG III programmers in light. Because of turnover among the huge installed System/36 and 38 base, there continue to be many openings.

"I wish I could get a lot more 38 programmers," says Dave

Fanshau, managing director of Source EDP in San Francisco. The demand for System/38 programmers is strong despite the reluctance of DP shops to rush over to the AS/400, he says.

In both Texas and Northern California, the demand for Sys-

tem/36 and 38 personnel. System/36 programmers are scrambling to upgrade their skills, Sutherland says.

"It's no surprise. The AS/400 has diminished RPG II skills. Anybody in the RPG II environment is sitting on a dead horse," says Bert Frederickson, president of EDS Computer Services, Inc., a custom-software house based in Marlboro, Mass.

Frederickson currently employs 10 RPG programmers, of

good supply of people willing to accept lesser pay for the opportunity to get onto a new track," Frederickson says.

Tongue twinking Brian Hoffman, vice-president of MIS recruiting at Winter, Wyman & Co. in Waltham, Mass., recommends that even RPG III programmers upgrade their skills if they expect to advance in the AS/400 world. "We see the AS/400 platform supporting multiple languages. Within the AS/400 world, we expect to see a migration to Cobol," he notes.

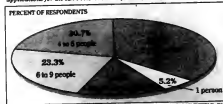
David Turner, vice-president of the MIS division at L.A. Silver Associates, Inc., a recruitment firm based in Framingham, Mass., expects the AS/400 to require fewer support people than the System/38. He recommends that RPG III programmers explore opportunities at the commercial software houses and consulting firms that serve the System/36 and 38 and AS/400 market.

RPG III programmers with two to three years of experience generally can earn \$20,000, says Winter Wyman's Hoffman. Software developers and consultants will pay considerably more if the programmer is experienced in product development and custom work. RPG II programmers rarely reach \$30,000 and must upgrade their skills to break through that barrier.

Radding is a Boston-based author specializing in business and technology.

Conversion crews

Most DP managers surveyed at 95 companies expect to convert applications for an IBM AS/400 with five or fewer people



SOURCE: FOCUS RESEARCH SYSTEMS, INC. (CF C0482)

tem/38 programmers has not fanned out to System/36 programmers, the recruiters say. But Robert Sutherland, president of Connors, a Chicago-based international IBM users group, says there is a great demand for good System/36 programmers and a short supply of them, particularly among consulting organizations.

The AS/400 is highlighting the diverging career paths for

whom only three are experienced with RPG III. He is looking more, but says he intends to train his RPG II programmers in RPG III so he will be well-staffed to handle the AS/400.

The introduction of the AS/400 is driving up salaries for those few RPG III programmers who have training on the AS/400, but employers willing to help RPG II programmers upgrade their skills are finding "a

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Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states.

For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld*.

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reaching qualified candidates — in fact, we initially felt it would work even better for us than local newspapers.

"We were right. Computerworld does an excellent job of getting our image across to people — and getting them interested in our company. Maybe we'll hire someone right from the ad, which we do. Or maybe we'll impress upon quality people that we're regularly hiring in their fields, which is just as important to us. The bottom line is that

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MARKETPLACE

Mail-order vendors maturing

Many dealers of PC products now cater to corporate customers' needs

BY JOE ROBCHAUX
SPECIAL TO CW

There are some things you just know. There is no need to think about them to make up your mind — you just know. This knowledge saves you time.

But it can also cost you something — accuracy. Sometimes, what you just know may no longer be true.

A recent poll showed almost half of all microcomputer professionals would never consider buying microcomputer products through the mail. They just know that buying locally makes sense. Knowledgeable sales professionals offer quick service and valuable advice. The service folks can patch the worst inaccuracies and the training centers can flatten learning curves.

This view is common. But is it accurate? Not necessarily. It is a sure bet that a local zip code does not guarantee the best buy. Sometimes, the best technical support, the most responsible and professional salesperson, the widest product selection, the quickest delivery, the best price

and the safest and most reliable purchase come when a customer buys mail order.

Here today . . . Mail-order outfits suffer from a fly-by-night stigma. Everyone is worried that the outfit will disappear tomorrow — with their money. There are mail-order horror stories, and many of them are true.

However, a local dealer is susceptible to many of the same business challenges as a mail-order dealer and can also go out of business. Almost half of the computer stores doing business in my town a few years ago are no longer open. Like mail-order houses, local dealers can also refuse to refund money on faulty merchandise, employ salesmen who were selling shoes last week and steroids the week before or keep a machine for months to get it serviced.

Some purchasers buy locally to take advantage of local dealer's product recommendations, training or technical support. I have found this reason to be sensible. Most local dealers offer a

wealth of knowledge — if a customer needs help with Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s dBase or Wordperfect Corp.'s Wordperfect. They offer technical sup-

A RECENT poll showed almost half of all microcomputer professionals would never consider buying microcomputer products through the mail.

port as long as it is limited to the Software Top 10.

But corporate buyers do not need this expertise; they have already found solutions for their generic spreadsheet, word processing and database needs. Most of them have also built training programs and have a solid base of knowledgeable users to smooth the way for new ones. The training local dealers offer is valuable — if it is needed. If not, why pay for it?

It is not that corporate buyers never need advice. But their technical problems do not in-

volve Lotus macros. They have problems routing print to a laser printer controlled by a device driver attached to a local printer to an IBM DOS/VSE system on a leased line.

The technical support for these problems comes from the manufacturer working with in-house technical people — not from the local computer store.

with your typical telemarketer. A customer might talk to a systems programmer, chemical engineer or telecommunications expert — someone who knows the market.

Catering service Mature mail-order sellers have discovered the corporate market and cater to business buyers. They accept purchase orders, offer attractive terms, assign account representatives and take facsimile orders. With express shipping, a customer may actually receive mail-order purchases more quickly than he would a local order.

Local computer stores offer a valuable service — if it is needed. Many small companies do not have the in-house staff for product evaluation, training, technical support and information planning. Local retail stores provide a needed service to these users.

But larger organizations maintain a staff to address such requirements in-house. Their needs also tend to be more complex. For them, it pays to evaluate all solutions to information problems — including solutions offered by a maturing mail-order segment.

Robichaux is a systems analyst with Georgia Gulf Corp. in Baton Rouge, La.

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	Closing price	Recent high	Recent low
IBM PC Model 076	\$725	\$1,000	\$550
XT Model 086	\$1,100	\$1,250	\$900
XT Model 085	\$1,250	\$1,500	\$1,050
AT Model 099	\$2,200	\$2,450	\$1,700
AT Model 239	\$2,600	\$2,900	\$2,300
AT Model 339	\$3,150	\$3,650	\$2,900
PS/2 Model 30	\$1,525	\$1,700	\$1,300
PS/2 Model 50	\$2,350	\$2,600	\$1,900
Compaq Portable I	\$825	\$975	\$650
Portable II	\$1,850	\$2,000	\$1,650
Portable III	\$3,900	\$3,550	\$2,825
Portable 286	\$2,650	\$2,350	\$1,875
Pisa	\$1,100	\$1,100	\$900
Deskpro 20-MHz	\$1,025	\$1,450	\$975
Deskpro 286	\$2,575	\$3,150	\$2,000
Deskpro 386	\$4,625	\$5,100	\$4,300
Apple Macintosh 512	\$750	\$900	\$595
512E	\$775	\$925	\$600
Pisa	\$1,175	\$1,325	\$950
Pisa 20-MHz	\$1,425	\$1,450	\$1,300
SE	\$1,950	\$1,950	\$1,700
SE 20-MHz	\$2,400	\$2,525	\$2,250
II	\$5,250	\$5,250	\$4,500
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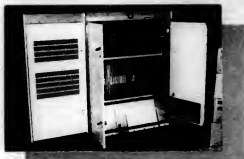
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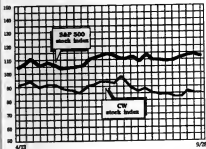


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STOCK TRADING INDEX



<i>Index</i>	<i>Last Week</i>	<i>This Week</i>
Communications	95.7	96.6
Computer Systems	94.7	95.5
Software & DP Services	102.9	100.9
Semiconductors	59.3	58.8
Peripherals & Subsystems	79.6	80.0
Leasing Companies	113.2	114.4
Composite Index	85.6	85.5
S&P 500 Index	113.8	112.2

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPT. 28, 19

[illegible]

Communications and Network Services

A	AMERICAN INFO TECHS CORP	18	24	93.75	-1.3	-1.9
B	BANK ONE CORP	10	11	16.3	0.3	1.9
C	CAPELL CORP	3	30	25.875	0.5	-2.6
D	DANIEL JAMES CORP INC	3	10	5.75	-0.1	-2.6
E	ENTER CORP	3	10	5.75	-0.1	-2.6
F	FELLSVILLE CORP	3	10	5.75	-0.1	-2.6
G	GAMMA TECHNOLOGIES	3	10	5.75	-0.1	-2.6
H	HILL BELL COS INC	3	10	5.75	-0.1	-2.6
I	INTEGRATED COMMUNICATIONS	3	10	5.75	-0.1	-2.6
J	JANUS CORP	3	10	5.75	-0.1	-2.6
K	KALAMAZOO COMMUNICATIONS	3	10	5.75	-0.1	-2.6
L	LANE CORP	3	10	5.75	-0.1	-2.6
M	MARSHALL CORP	3	10	5.75	-0.1	-2.6
N	NATIONAL COMMUNICATIONS	3	10	5.75	-0.1	-2.6
O	ORION CORP	3	10	5.75	-0.1	-2.6
P	PACIFIC TELEVISION GROUP	3	10	5.75	-0.1	-2.6
Q	QUANTUM CORP	3	10	5.75	-0.1	-2.6
R	REPUBLIC CORP	3	10	5.75	-0.1	-2.6
S	SCIENTIFIC ALABAMA INC	3	10	5.75	-0.1	-2.6
T	TELECOM CORP	3	10	5.75	-0.1	-2.6
U	UNITED CORP	3	10	5.75	-0.1	-2.6
V	VISUAL COMMUNICATIONS	3	10	5.75	-0.1	-2.6
W	WILLIS CORP	3	10	5.75	-0.1	-2.6
X	XEROX CORP	3	10	5.75	-0.1	-2.6
Y	YOUNG CORP	3	10	5.75	-0.1	-2.6
Z	ZION CORP	3	10	5.75	-0.1	-2.6

DAVIDS MED SYS CORP	38	15	18,125	0.0	0.0
DAVID SOFTWARE INC	13	9	7.75	-0.1	-1.0
SOFTWARE PUBLG CORP	27	9	23,875	-0.3	-2.0
STERLING SOFTWARE INC	11	8	6,875	0.4	5.0
STUNGUARD DATA SYS INC	30	10	16.75	0.3	1.0
SYSTEMS INC	34	18	28.5	-2.3	-7.0
SYSTEMS INC	34	7	21,875	-0.4	-1.0
SYSTEMS INC	38	7	14.75	0.6	3.0

Semiconductor

ADIV MICRO DEVICES INC	25	0	10.875	-0.1	-1
ANALOGIC DEVICES INC	20	0	11.125	-0.6	-7
ANALOGIC CORP	11	5	7.125	0.1	1
CHIPS & TECHNOLOGIES INC	30	18	11.0	-0.9	-9
INTEL CORP	42	18	27.25	-1.3	-5
LSI LOGIC CORP	15	7	10	-1.1	-10
MICROVISION TECHNOLOGY INC	28	0	20	1.0	8
MOTOROLA INC	74	36	42.75	-1.1	-2
NAUFI SEMICONDUCTOR	22	0	8.25	-0.1	-1
TEXAS INSTRUMENTS INC	83	0	14.25	-0.5	-5
UNIVERSAL CORP	27	13	14.125	0.5	5

Peripherals

ALLOY CORP.	10	2	2.5	-0.1	-4
AM INTL INC.	8	3	8.25	-0.1	-4
AMT INC.	11	8	8.25	-0.9	-4
AUTO TROL TRAC CORP	10	3	4.875	-0.4	-7
BANETEC INC	14	8	8.125	-0.1	-4
CLIMAX CORP	10	3	8.125	-0.8	-3
COMINTONICS INC	4	2	3	0.7	-6
CONQUEST CORP	10	4	7.8	-0.1	-4
COVER PAPER MILLS	24	7	10.625	0.1	-1
DAVIDSON CORP	10	3	8.375	-0.1	-4
DELMAR CORP	17	10	16	0.5	-1
DELTA CORP	10	3	44.75	-0.1	-4
DELTA WASH HOLDG CO	25	4	4.125	0.1	-1
D E C CORP	10	3	13.1	0.1	-1
EMULEX CORP	28	14	15	0.1	-1
ENVIRO SYSTEMS INC	10	3	13.125	-0.1	-4
ESTI CORP	28	14	15	0.1	-1
INTERLINK INC	10	3	3	-0.2	-7
IONEX CORP	10	3	3	-0.2	-7
LEE DATA CORP	8	3	2.875	-0.1	-4
MACRO SYSTEMS CORP	10	3	2.313	-0.1	-4
MAISON CORP	10	3	8.625	-0.4	-7
MICROCORP	24	10	8.5	-2.3	-9
MICROTECH CORP	10	3	8.75	-0.1	-4
MILWAUKEE CORP	14	45	64	-0.1	-4

Computer Systems

[illegible]

Leasing Companies

AMPLICON INC	17	7	14.5	0.3
CAPITAL ASSOC INTL	8	8	6.75	-0.1
COMERCO INC	37	13	30.625	-0.4
CONFIDENTIAL INFO SYS	11	4	4.25	0.4
LOH CORPORATION	17	8	13.25	0.5
SELECTERN INC	8	8	4.75	-0.1

Livestock

Stock market begins to graze in the green again

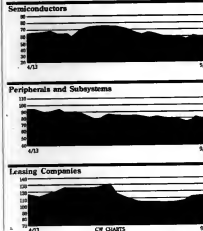
Nobody's talking tidal waves or quantum leaps yet, but the stock market at large did show signs of renewed activity last week — prodded, according to analysts, by institutional investors' end-of-the-quarter portfolio adjustments. Prominent among the stocks benefiting from the small surge were IBM, which closed up 2½ points at 115½, and Digital Equipment Corp., climbing 3½ points to end the week at 96½.

The warm wind of optimism took the chill off of AST Research, Inc.'s report that its current-quarter results will come in below expectations; warning notwithstanding, the company's stock rose $\frac{1}{8}$ of a point to 8 $\frac{1}{2}$.

The favorable breezes, however, did not blow through Westboro, Mass. In what is becoming an annual event, Data General Corp. announced a round of cost-cutting, including a massive layoff; near the end of the week, its stock was down $\frac{1}{4}$ of a point from $\$4\frac{1}{2}$.

MSI Data Corp. — entertaining takeover offers from unsolicited suitor Telxon Corp. and white knight Symbol Technologies, Inc. — saw its stock soar 5¼ points from 17 to 23¼.

NELI MARGOLIS



Network standards or nothing

Users still see single-vendor interest in latest management strategies

BY KATHY CHIN LEONG
CW STAFF

Digital Equipment Corp.'s recent entry filled out the rest of some major systems vendors offering multivendor network management strategies. But users are taking a jaundiced view of DEC's Enterprise Management Architecture and the other strategies, seeing them as maneuvers to lock them into a proprietary environment.

The other playing pieces are in place, and vendors have drawn their lines — IBM with Netview, Hewlett-Packard Co. with its graphical Openview and AT&T with its Unified Management Network Architecture (UMNA) to support voice and data.

A variety of users expressed

frustration, charging that the network management strategies espoused do not seem to sufficiently connect hybrid networks. "It looks like the issue of standards is being mucked once again," one user said.

The major vendors have said their network management architectures will become compatible via the ISO's Open Systems Interconnect (OSI), but each company is approaching OSI development differently. While AT&T and HP are participants in the OSI forum to further network management standards, DEC and IBM are not joined.

Many skeptics, however, said they will wait their network management decisions until they see products that will easily interoperate among different

hardware persuasions.

For captive IBM, DEC or AT&T shops, however, users agreed that some network management is better than none at all.

The advent of distinct network management systems further confuses the market, according to Ken Minnet, network systems manager at Chevron Corp., a Netview user.

No help to users

The vendors' global promises carry little weight with some users who believe the industry has yet to solve user problems of physical connectivity. "It's been hard enough getting different vendors' products to communicate. We've had no time for multivendor network

to information databases and to print servers and file servers across long-distance ISDN links. The aim of the proposal is to ensure ISDN compatibility with standard PC LAN technology, including IBM's Netbios and Token-Ring protocols. If implemented, this project would make departmental resources to hundreds of remote users over 54K or 128K bit/sec. lines.

Obstacle or two

Even if vendors agree to meet those user requirements, several obstacles may slow user acceptance of ISDN, users said. Many large sites are concerned that ISDN suppliers will resist standardization for fear of losing a competitive edge on special features.

Another concern is that ISDN will not provide enough bandwidth for some applications, including full-motion video. ISDN currently supports data-compressed video over a 128K bit/sec. line, which updates the picture only when changes occur. The resulting stilted motion makes some users feel ISDN video is better suited to "chalk-talks" than to videoconferencing.

management so far," said George Billings, manager of Network Computing Services at Pitney Bowes, Inc.'s Corporate Engineering and Technology Division in Stamford, Conn.

Brave users are beginning to tackle the network management problem through a series of pilots. At Rush Presbyterian Hospital in Chicago, the new products from these vendors will be tested thoroughly, said Bill Wellman, Rush associate vice president of administration. The hospital has installed prototype pilots of Netview. In a separate department, AT&T's UMNA software is under scrutiny.

While the vendors have said the network management products will interoperate with other systems, users are skeptical about the level of network management. Dave Langenhove, Bell operating company and long-distance firms providing transmission services.

This fear has prompted the Tele-Communications Association (TCA) and large network users to appeal to the Federal Communications Commission to clarify exactly what network data is available to these vendors.

Users with large networks, such as banks and insurance companies, are concerned that published details of where and how circuit is routed can be misused. "We don't want someone like an AT&T to use our information and then turn around and compete against us," said Leland Fong, a network planner at Visa International in San Francisco. Users are demanding that the FCC establish a set of rules and regulations so the information is not abused.

At issue is the term "customer proprietary network information" (CPNI), which encompasses call data, address and circuit information and traffic statistics on networks. Under the FCC's Computer Inquiry III rules, long-distance carriers and Bell operating companies — specifically, marketing personnel — can get access to their own customers' CPNI unless users request confidentiality. What

will be able to restore it and fast remedy."

At the University of Southern California, network manager Jim Widel said he would like to obtain a centralized network reporting system but that "the network interfaces from these don't seem to do much."

Hence, users of hybrid networks are waiting until the OSI standard matures. Others will wait until they see a vendor address management of voice, T1 and Integrated Services Digital Networks.

Users are adamant in demanding one generic network management scheme to take care of these multivendor nets.

Chevron's Minnet said, "I would rather have a standard network management package that did basic management for all the vendors than to have a vendor-specific package that had all the bells and whistles."

Senior Editor Elizabeth Horwitz contributed to this report.

Wish list

FROM PAGE 1

ISDN to work with all types of CPE equipment. . . . The question before us is, How do you make it real? said Richard W. Stephenson, a Southwestern Bell Corp. district manager who is chairman of the forum's ISDN Implementers' Workshop.

A strong point

Large users point out that the ISDN user's forum will be helpful in convincing vendors of the need for standardization.

"What's happening here is analogous to what happened in the early stages of the MAP/TOP users group," said Jim Spler, a telecommunications manager in General Motors Corp.'s Electronic Data Systems Corp. (EDS) subsidiary.

"This is our chance to explain a series of business situations to a set of ISDN vendors. If the vendors realize just how big the business opportunity is, they'll also understand the need to standardize."

Among the user proposals for ISDN applications submitted for vendor review are the following:

• A proposal by EDS that would link thousands of high-resolution graphics terminals for the purpose of sharing computer-aided design and manufacturing drawings. EDS would like an ISDN interface that works equally well with workstations made by Sun Microsystems, Inc., Apollo Computer, Inc., Hewlett-Packard Co., Digital Equipment Corp. and IBM.

GM also proposed a Manufacturing Automation Protocol 3.0 interface to connect factory-floor networks with wide-area networks through ISDN technology.

• A proposal by American Express Co. — already being used in a pilot project — to use incoming phone calls as a trigger for the retrieval of customer account information.

The American Express proposal aims at saving time, reducing data traffic and providing higher levels of customer service. The three-month ISDN pilot, which uses a Megacom 800 switch to handle toll-free customer inquiry calls, began this summer.

• SM Co. proposed a data-conferencing capability that would allow local-area network access

TCA pushes for privacy on corporate networks

BY KATHY CHIN LEONG
CW STAFF

SAN DIEGO — As more and more confidential data winds its way across corporate networks, users are expressing alarm over how much of that information is safe from outsiders. Tele-Communications Association (TCA) and large network users to appeal to the Federal Communications Commission to clarify exactly what network data is available to these vendors.

Users with large networks, such as banks and insurance companies, are concerned that published details of where and how circuit is routed can be misused. "We don't want someone like an AT&T to use our information and then turn around and compete against us," said Leland Fong, a network planner at Visa International in San Francisco. Users are demanding that the FCC establish a set of rules and regulations so the information is not abused.

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his group wants, TCA President Jerry Appleby said, is for the FCC to clarify exactly what falls under the category of CPNI.

Fong added that users can be at the mercy of the Bell operating companies and long-distance vendors if there is no safe-guarding of sensitive information such as calling patterns can be used by the operating companies for their own competitive advantage, he said. "At this time, there are no controls over CPNI, and the users need to see some action on this," Fong said.

Spread the concern

At a meeting here during the TCA show, TCA officials and the association's government liaison committee met with AT&T to discuss the issue. The group will also voice its concerns to other vendors.

Appleby said the issue should not be of concern just to network managers but to the entire company. Earlier this month, several banks, including Chase Manhattan Bank and Security Pacific National Bank, and credit card companies met with the FCC to urge it to come up with a standard definition for CPNI, Appleby said.

Another customer information is generally confidential, it is available to the transmission carrier that is supplying the line. The data is also available to the marketing departments of that vendor unless a company asks for confidentiality. Fong said there is no regulation that prevents a company from passing the data along to its subsidiaries.

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TRENDS

DP budgets

Nearly 18% of U.S. industries spend in excess of \$5 million on their data processing budgets, with slightly less than half of those spending more than \$1 million, according to a recent survey.

The findings of Focus Research Systems, Inc. in West Hartford, Conn., also indicated that, of IBM and plug-compatible sites across the country, those with IBM 3000 series computers have the largest MIS budgets. Of sites using the IBM 3000 series, almost half spend more than \$5 million on DP annually. Those budgets include salaries for internal staff, outside consultants, educational training, hardware and software.

Forty-five percent of the sites with National Advanced Systems computers spend between \$1.1 million and \$5 million, while more than half of the sites with Amdahl Corp. computers spend more than \$5 million on their MIS budgets.

Sites with IBM 360 and 370 computers were found to spend the least: 93% had budgets of as much as \$1 million, and more than half of those spend less than \$500,000, according to the interviews.

The majority of the big spenders fall into the categories of transportation, communications and utilities industries, with more than 35% of the companies involved in those industries spending in excess of \$5 million on information technology and another 39% spending between \$1 million and \$5 million.

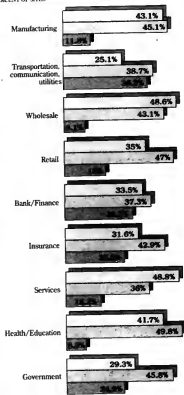
According to the survey, wholesale and services industries spend the least on DP, with close to half of the companies reviewed claiming to spend less than \$1 million on their information technology budgets. Almost 20% of the companies involved in services said their budgets for technology are below the \$500,000 level.

Falling into the category in which the majority of firms typically spend \$1 million to \$5 million on DP were retail, banking and finance, insurance, health and education, manufacturing and government.

ALAN J. RYAN

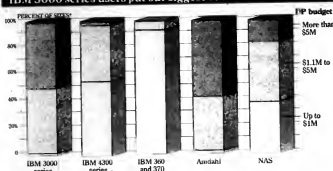
Expenditures vary by industry

PERCENT OF SITES*



DP budget
 * Base of 11,000 respondents

IBM 3000 series users put out biggest bucks



* Base of 11,000 respondents

SOURCE: FOCUS RESEARCH SYSTEMS, INC. CTR. CHICAGO

INSIDE LINES

Ready to dump it in your lap. Look for Compaq to unveil its long-awaited laptop version of its Design 286 at an Oct. 17 press conference, according to sources. Industry watchers were looking for the laptop at a press conference held two weeks ago, which resulted in a number of erroneous press reports. At the Sept. 19 gathering, Compaq Chairman Rod Canion said, the laptop "will be announced as planned on the date we planned to announce it." Compaq officials have declined to make any more specific comments on the machine.

A vote against "aberrations." Who said the computer industry has liberal leanings? Certainly not Storage Technology President Ray Poppa, who recently wrote to the Colorado United Way urging the charity not to fund gay organizations. His letter discouraged support of "the quest for public recognition . . . of such social aberrations." Storage Tek is one of the local charity's largest contributors.

Get it all out in the Open. Sun Microsystems will likely follow suit if AT&T decides to join the Open Software Foundation. AT&T and the OSF are in negotiations over the future of the Unix operating system. "Sun is in a supporting role in the development of Unix," a Sun spokesman said. "Once negotiations between AT&T and OSF are concluded, Sun will make its decision." In fact, William Joy, Sun's R&D chief, was present at the OSF meeting last week (see story page 8) as an invited guest and, according to the OSF, a "prospective member."

Brave new world. NEC Home Electronics is prepping a four-pound laptop that uses a whole new approach to storing data and programs. Unlike most Microsoft MS-DOS compatible laptops that use floppy and hard disks, this one comes standard with about 1M byte of nonvolatile random-access memory. That way, the machine can be both lighter and sturdier. The machine also comes with a flip-up 640- by 480-pixel LCD display.

Blue troops get religion. The word from the trenches is that IBM sales representatives are unusually enthusiastic about the Application System/400 mid-range systems. Users more accustomed to the minisystems selling System/360 like they were just so many cologne bottles being inundated by fervent marketers eagerly pointing to new features, as in: "Hey, come here. Let me show you what I learned to do on this thing." The irony is that most of those next features have been around for almost a decade at the heart of the System/38 — the computer with the loyal customer base and the lukewarm backing of IBM.

Here's the Word on Windows. Folks have long wondered why it has taken Microsoft so long to kick out Windows applications when they have been tirelessly telling all other software vendors that Windows is the way to go. One of the reasons, at least in word processing, is that Microsoft is doing just fine without good old Windows. The firm has been doing exceptionally well developing a Windows-based word processor, but the character-based Word is selling so fast that the firm has held the project back. But Windows aficionados should fear not, because the product looks to be heading to beta in a month or so and should ship early next year.

We can't work on 1-2-3? Gee! In the rush to get 1-2-3 Release 3.0 done, Lotus has apparently pulled some programmers off the graphical 1-2-3-G project. But the Presentation Manager-based G program will still get finished by next summer or fall, a Lotus source confidently maintained.

Putting his life on the line. An AT&T spokesman would stop at nothing last week to deny a published report that the company was hauling out on Sun's RISC processor. He offered up his home address as our reporters could bomb it if his denial was later retracted, which is an opportunity we've often wished for in dealing with official spokesmen. If you're unhappy with official statements, call the hot line at 800-343-6474 or 202-879-0700 and let News Editor Pete Bartelink put his news hounds on the scent of the real story.

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